HORTICULTURAL ABSTRACTS

Vol. XXVI September 1956 No. 3

Initialled abstracts not by Bureau staff are by A. H. M. Kirby, A. M. Massee and S. C. Pearce of the East Malling Research Station, W. B. Turrill of the Royal Botanic Gardens, Kew, and G. St.C. Feilden.

INDEX OF CONTENTS.

			Nos.
MISCELLANEOUS	Abstr. 74.	Noted 33	2341-2416g
Climatic factors			2341-2348
Soil and water			2349-2357
Nutrition			2358-2365
Physiology and biochemistry			2366-2381
Growth substances			2382-2391
Seeds			2392-2397
Statistical design			2398-2402
Glass and plastic houses			2403-2406
Machinery and equipment			2407-2414
Noted			2415a-2416g
TREE FRUITS, DECIDUOUS	Abstr. 86.	Noted 51	2417-2504y
General			2417-2419
Breeding and varieties			2420-2431
Propagation and rootstocks			2432-2446
Growth and environment			2447-2450
Soil management			2451-2456
Nutrition			2457-2462
Training and pruning			2463-2468
Pollination			2469-2473
Blossom and fruit thinning			2474-2479
Fruit drop and size			2480-2483
Fruit composition			2484-2486
Harvesting and packing			2487-2491
Storage			2492-2502
Noted			2503a-2504y
SMALL FRUITS, VINES AND NUTS	Abstr. 53.	Noted 25	2505-2558y
Small fruits			2505-2534
Vines			2535-2553
Nuts			2554-2557
Noted			2558a-2558y
PLANT PROTECTION OF DECIDUOUS FRUITS	Abstr. 111.	Noted 51	2559-2671y
General			2559
Disturbances of nutrition or of unknown origin			2560-2564
Climatic factors			2565-2572
Viruses			2573-2584
Bacteria			2585-2589
Fungi			2590-2616
Nematodes			2617-2618
Mites			2619-2628
Insect pests			2629-2652
Other pests			2653-2655
Spray materials and residues			2656-2666
Apparatus and technique			2667-2669
Noted			2670a-2671y
WEEDS AND WEED CONTROL	Abstr. 65.	Noted 21	2672-2737u
General			2672-2678
Control of perennial weeds			2679-2687
Control of aquatic weeds			2688-2689
Weed control in fruit crops			2690-2694
Weed control in nurseries and shelter belts			2695-2697
Weed control in lawns			2698-2702
Weed control in vegetables			2703-2719
Weed control in tobacco seed beds			2720-2721
Weed control in tropical crops			2722-2729
Herbicides and apparatus			2730-2736
Noted			2737a-2737u
VEGETABLES, TEMPERATE, TROPICAL AND GLASSHOUSE	Abstr. 126.	Noted 72	2738-2866t
General			2738-2759
Artichokes			2760-2761
Brassicas			2762-2773
Celery and celeriac			2774-2776
Cucurbits			2777-2785
Legumes			2786-2808
Mushrooms			2809-2812
Onions and related crops			2813-2820
Rhubarb			2821
Root crops			2822-2828
Salad crops			2829-2831
Spinach			2832
Tomato, capsicum and eggplants			2833-2863
Noted			2864a-2866t
TOBACCO	Abstr. 41.	Noted 18	2867-2908r
General			2867-2868
Cultural practices			2869-2876
Growth phenomena			2877-2880
Physiology and biochemistry			2881-2889
Diseases and pests			2890-2902
Curing and fermentation			2903-2907
Noted			2908a-2908r
MISCELLANEOUS TEMPERATE AND TROPICAL PLANTS	Abstr. 39.	Noted 23	2909-2948w
Culinary and spice plants			2909-2911
Drug plants			2912-2924
Essential oils			2925-2928
Fibres			2929-2930
Hops			2931-2933
Insecticidal plants			2934-2940
Rubber plants			2941
Seed oils			2942-2946
Tannin plants			2947
Noted			2948a-2948w

	Nos.
FLORICULTURE Abstr. 92. Noted 44	2949-3042r
General	2949-2966
Annual and herbaceous plants	2967-2982
Bulbs, tubers, etc.	2983-3012
Lawns	3013-3014
Roses	3015-3021
Other trees and shrubs	3022-3040
Noted	3041a-3042r

	Nos.
SUB-TROPICAL FRUIT AND PLANTATION CROPS Abstr. 76. Noted 19	3043-3119s
Avocadoes	3043-3047
Citrus—propagation and rootstocks	3048-3051
Citrus—nutrition	3052-3062
Citrus—water and temperature effects	3063-3067
Citrus—fruiting control	3068-3077
Citrus—air pollution, diseases and pests	3078-3093
Citrus—fruit composition and storage	3094-3100
Dates	3101-3103
Litchis	3104-3106
Olives	3107-3116
Persimmons	3117-3118
Noted	3119a-3119s

	Nos.
TROPICAL FRUIT AND PLANTATION CROPS Abstr. 71. Noted 44	3120-3192r
General	3120-3123
Bananas	3124-3128
Cacao	3129-3130
Coconuts	3131-3134
Coffee	3135-3141
Guavas	3142-3143
Mangoes	3144-3148
Oil palms	3149-3153
Papaws	3154-3155
Pineapples	3156
Rubber trees	3157-3159
Sugar cane	3160-3176
Tea	3177-3184
Sundry crops	3185-3190
Noted	3191a-3192r

	Nos.
NOTES ON BOOKS AND REPORTS Abstr. 41. Noted 20	3193-3234t
Books	3193-3207
Annuals and reports	3208-3232
New periodicals	3233
Noted	3234a-3234t

Total abstracts 875. Noted 421.

N.B.—Numbers sub-divided alphabetically refer to items noted but not abstracted.

EDITORIAL NOTES.

A RECORD IN "ALSO-RANS"!

At various times we have been urged:

(1) To confine ourselves to publishing abstracts of the more important research papers of interest to horticulturists.

(2) To make sure that everything of possible interest to horticulturists is recorded.

These two methods of approach are, of course, diametrically opposed and their pros and cons can be discussed *ad nauseam*. In the background, sordid but potent, is the fact that the relationship between size and cost is linear—and all the time the literature is increasing.

Needless to say we have compromised and in doing so have divided our material into two categories, papers to be abstracted and papers to be noted by title only. In the past most of the originals were abstracted and relatively few merely noted. But in the present number the reader will, possibly with some misgiving, find fewer abstracts than in any number of recent years and considerably more "noteds".

This is the outcome of a deliberate attempt to deal with the many problems involved in the ever increasing literature by eliminating from among our abstracts, now and in future, all material, which does not describe new research or developments, or which is likely to be dealt with more fully in other C.A.B. abstract journals. The process of elimination will demand greater editorial attention but should result, we believe, in better balanced work with emphasis more clearly marked and in a saving of time to the reader.

In wielding the axe we have felt it necessary to apply rather stricter standards to work on crops on which research has reached an advanced level than to work on crops, regarding which little research has been done. We have also made some allowance for readers, such as those in the tropics, whose library facilities are meagre. We believe in Horticultural Abstracts, Vol. 26, No. 3, to have achieved the maximum, *practical* degree of compression and condensation possible within our present field of cover.

A word finally on the "noteds". They are not "also rans" in the sense that they contribute nothing of value. Thousands of articles, which might justly be so described, are seen by us, but they appear here neither in abstract nor in note form.

Those papers which are now recorded by title only, or more often with a line or two in explanation, are papers which we consider useful but which fall into one or other of the following categories:

(1) Papers, which provide alternative accounts of work already published and abstracted; in these cases the earlier abstract is indicated.

(2) Certain research papers received several years late but still necessary to complete a picture.

(3) Review articles, which include some of the most valuable papers, but about which little useful can be said in an abstract.

(4) Papers of indirect horticultural interest; these include papers concerned primarily with mycology, entomology, genetics or soils, all of which are covered by other C.A.B. journals, and papers describing basic research on plant physiology and biochemistry, in which horticultural crops happen to figure as test plants.

(5) Articles describing new machines or apparatus or new techniques, which are only likely to be of value if examined in the original.

Further it should be remarked that nearly all the "noteds" are cross-referenced under the sub-headings in the "abstract" sections, and that all will be indexed in due course.

We should welcome our readers' comments.

SALIENT ITEMS. Vol. 26. No. 3.

CLIMATIC EFFECTS AND THEIR MODIFICATION.

General:—If one can overcome a rather natural distaste for turnip greens a detailed series of cooperative investigations on the effects of environment on their growth and composition should be of interest (2765–2767), as should studies on seasonal and regional variations in the catechins of tea leaves (3182, 3183). Environment may also affect the structure and composition of plant cuticle (2378).

Rainfall, irrigation and water relations:—A new method of calculating the reliability of monthly rainfall is discussed in one paper (2341) and methods of determining the water needs of crops from climatic data in two others (2352, 2353). With lemons the electric potential of the fruit might be used as a guide to the timing of irrigation (3064). Other aspects reported include studies on soil moisture deficits under grass swards (2452, 2453), the effects of moisture deficits at different stages of growth on the development of bean plants (2793), the effect of water-table fluctuations on root growth in citrus (3063), the transpiration of glasshouse crops in relation to radiation (2354) and investigations on the comparative drought resistance of several temperature fruits (2572).

Temperatures, high and low:—In addition to phenological data on some 900 peach and nectarine varieties (2571), information is given on the responses of 2 peaches to various amounts of winter chilling (2570). The effects of temperature on runner formation in strawberries (2532) and flower bud differentiation in citrus (3068) are also reported, as are the interacting effects of temperature and photoperiod on growth in raspberries (2520), leaf size in strawberries (2531), flowering in chrysanthemum (2973) and morphine formation in opium poppies (2918). A formula is provided for predicting night frosts (2342) and a description is given of suspected ice-girdling of mounded peach trees (2569).

Light:—Trials on the use of artificial light to control flowering or fruiting are described for various ornamentals (2952, 2979, 2980, 2985, 3008) and vegetables (2780, 2838, 2839). More fundamental studies include the effects of day-length on enzyme activity in plants (2372) and of light on nodule formation in peas (2791). The effects of different light sources on leaf temperatures in photoperiod chambers are also recorded (2366).

Air pollution:—Fluorine compounds figure most prominently in the latest batch of papers on this sombre theme (2347, 2348, 3078), but hydrochloric acid fumes are also blamed for some damage (2961) and smog blankets in general for the aggravation of injuries caused by copper sprays (3083).

MACHINERY, EQUIPMENT AND BUILDINGS.

Machines and implements:—A new tractor attachment now makes it possible to carry out transplanting and harvesting operations at speeds as low as 0·2 m.p.h. (2408), but presumably a "machine for the rapid planting of poplar seedlings and cuttings" can move faster than this (2409). For weed control there is a sprayer, which aims at tall weeds while missing short crops (2735), and a new mechanical weeder (2736). Among hydraulic platforms for orchards one can choose between monkeys and giraffes (2407, 2487). Other machines include one designed for prepackaging produce (2412), yet another castor bean huller-cleaner (2943), and, believe it or not, another mouse trail making machine (2655). To the non-mechanical it may be worth pointing out that persons priming tobacco are less liable to have a heart attack when doing the job sitting on a machine than when walking (2876).

Apparatus and techniques:—Research aids include a soil moisture meter (2413), a potometer for measuring the rate of water uptake by seeds (2396), a lesion counter (2669) and a thulium X-ray unit for determining decay in living trees (2668). Tetrazolium has proved useful for detecting surface injuries on citrus fruits (3098). Trials with triangular orifices for sprinkler irrigation and a new technique for estimating leaf areas in the field are also described (2357, 2401).

Cold stores:—Three papers deal with buildings and chambers and two with humidifiers for use in them (2492–2496).

Glass and plastic houses, etc.:—Apart from one paper on heating (2403) and another on ventilation (2404) there are several on plastic liners or plastic substitutes for glass (2405, 2406, 2749, 2953, 2954).

More plastics:—These appear as mulches (2539, 2748), tree fumigation tents (2667), irrigation siphons (2355), cubes for embedding insects and other specimens (2414) and as a new packaging film resembling cellophane (2759). Cellophane itself re-emerges in the form of flakes impregnated with fertilizers (2960).

NUTRITION.

Plant composition:—Leaf sampling procedures applied to citrus give rise to relatively small errors (3052), but with peaches crop load (2461), and with oil palms many sources of variation (3152), must be taken into account. With sugar cane the reliability of foliar diagnosis depends on there being sufficient replications (3166). Seed composition may be used as a guide to the nutrient status of rubber trees (3158), and in the case of copper applications to peas it would seem to offer a much more reliable indication of response than leaf analysis (2746).

Absorption and translocation:—Passing rather hurriedly over the complexities of differential cation absorption and the cation-exchange capacities of living and dead roots (2744, 3057), one may mention the effects of climate on the response of citrus to K (3043, 3056) and on the N content of tobacco as influenced by P applications (2870). As usual there are several new papers on the absorption and translocation of foliar-applied nutrients (2359, 2364, 2365, 2832, 2844, 2919, 3062 and 3138).

Odd effects:—Just as human beings are apt to show similar responses to a wide variety of alcoholic stimulants, so it would appear that plants may sometimes show surprisingly similar responses to a wide variety of nutrients (2549, 3070, 3136). The adverse effect of radioactive P on the germination of hyacinth pollen may be included among odd effects for lack of a more suitable place to record it (3006).

Boron:—The addition of B may increase the effect of hormone sprays on tomatoes (2845). Other papers on B relate to vines (2560), gladiolus (2994), citrus (3059) and olives (3111).

Iron:—It is suggested that Fe chelates are absorbed whole by the plant and that in the leaf the chelating agent is destroyed by sunlight thus releasing the Fe (2360). The effect of chelated Fe treatments applied to citrus may last for 2 years or more (3060).

Molybdenum:—A whole number of the journal *Soil Science* is devoted to reviews on this element (2361, etc.). There is also an account of the cure of strap-leaf of hibiscus by Mo applications (3032).

Zinc:—Studies on Zn nutrition relate to vegetables (2795), citrus (3062), coffee (3138) and hevea rubber (3159); the last of these also reveals a connection between Zn deficiency and severity of fungus attack.

PLANT PROTECTION.

Soil problems:—Some crop residues are toxic to succeeding crops (2561, 2740), whereas others may be indirectly beneficial because of their repellent effect on insect pests (2807). Certain soil fungi also excrete substances toxic to plants (2752), and one fungus has the disconcerting effect of causing strong iron-chlorosis leaf patterns without affecting the iron content of the leaves (3084). On the other hand some fungi normally regarded as parasitic may be beneficial to certain crops (2512), while others, given suitable encouragement, will suppress nematodes (3085).

Soil sterilization:—Beneficial as well as harmful organisms are destroyed by soil fumigation, and if this is followed by the planting of infected stock the result may be worse than when soil is left untreated (2997). Heat sterilization may render soils temporarily toxic (2350). Among new chemical sterilants allyl alcohol has shown promise against both weeds and fungi (2720, 2721, 2753, 2974).

Weed control:—New chemicals showing promise against grassy weeds include hexachloroacetone (2687) and disodium-monomethyl-arsenate (2733). Dalapon, which figures fairly prominently in the Weed Section, may be made more effective against some grasses by the addition of amino-triazole (2686).

Viruses:—Information is now available on the yield reductions caused in apple trees by mosaic viruses and on the propagation of healthy plants from the tips of rapidly-growing shoots (2574). With strawberries viruses may remain so localized in warm seasons as to permit the production of virus-free runner plants (2581). With raspberries the problem of controlling leaf curl disease is complicated by evidence that a soil-inhabiting vector may be responsible for transmission (2579), and with citrus the possibility of seed transmission of xyloporosis may upset a budwood certification programme in Florida (3082). With lettuce the use of indexed mosaic-free seed has led to a notable reduction in infection and big increases in yield (2830).

Fungicides and insecticides:—Certain fungicides may affect the germination of tree fruit pollen adversely, but the effect appears to be too slight to influence fruit set or yield (2663, 2664). The rate at which pruning wounds heal may also be affected by the fungicides used in spray programmes (2605). More information is available on the toxicity of greenhouse paints containing mercury fungicides and on ways of reducing it (3020). Among insecticides the term "booster" seems to be almost an understatement for sesamolin, a constituent of sesame oil, which increases the killing power of pyrethrum thirty-fold (2940). It may also be of interest to record that demeton has been successfully applied to hops through the normal sprinkler irrigation system (2933).

PROPAGATION.

Seed treatments:—It is remarkable what maltreatment seeds will tolerate and even enjoy. After being identified through the luminescence of their aqueous extracts (2392), counted photoelectrically (2393) and dried with infra-red rays (2394), they can be subjected to heat and cold (2837, 2880), treated with innumerable fungicides and insecticides (2750, 2796–2800, 2807), fumigated (2815) or soaked in methylene blue to change the sex of the plants raised from them (2778).

Seed germination:—A seasonal germination rhythm seems to be less common in cultivated than in wild plants (2397). In roses seed dormancy is affected by pre-harvest climate (3019). In stone fruits the

acceleration of germination by removing the shell or by stratification is attributed to the release of a volatile germination inhibitor (2432). Other papers describe the good response of seeds to mist watering (2955), the effects of sowing depth on the germination of vegetable seeds (2741) and the effects of sowing date on pod characters in beans (2788).

Cuttings:—The fact that constant mist results in the leaves of cuttings losing appreciable quantities of N, P and K (2434) adds point to the development of a new electronic leaf for regulating the supply of intermittent mist (2411).

Grafting and budding:—Dipping budwood or newly grafted plants in solutions of fungicides or antibiotics may sometimes be beneficial (2586, 3027).

Rootstocks, interstocks and scions:—In apples growth and cropping are affected more by the roots of the rootstock than by sections of rootstock stem (2440), but storage behaviour is affected more by interstocks than by rootstocks (2442). In citrus reciprocal grafts of regular- and irregular-bearing clones showed that the clone has more effect than climate on regularity of cropping (3072). Reciprocal grafts as well as interstocks have also been used in detailed studies on incompatibility in pome and stone fruits (2446). In some pear-quince combinations the degree of incompatibility may be such that the temporary union between stock and scion formed in double-shield budding may upset the growth of the plant (2438). Finally, if you want to try something really tricky in the way of inter-family grafts it may be helpful to start by germinating seeds of the scion species in sap from the rootstock species (2835).

MISCELLANEOUS.

Allelopathy:—Those who have no idea what this means may find enlightenment in 3199.

Exotic fruits:—An arctic raspberry (2519), a climbing strawberry (2528) and the first named variety of elderberry (2514).

Fruit tree height:—Economic studies suggest that apple trees should not be taller than 4 metres (2464).

Fruits cultured in vitro:—Strawberries and peas (2381).

Growth substances:—Bioassayed (2382), used to increase fruit size (2482, 2483, 2506), to break dormancy (2391) and to increase seed production (3011).

Leaf injury:—Respiration rates increased by cutting (2377).

Mycorrhiza:—The first record of the establishment of endotrophic mycorrhizal infection in plants raised under aseptic conditions (2534).

Swan song:—Pollination studies on new Canadian pear varieties (2472) lead inescapably to the conclusion that:

Enie, Menie, Miney, Moe
Seedless fruits from selfed flowers grow,
If bees are vicious, let them go,
Enie, Menie, Miney, Moe.

MISCELLANEOUS.

Climatic factors.

(*See also* 2415h, s, y, 2416f, 2565-2572, 2961, 2972, 3019, 3041m, 3078.)

2341. MANNING, H. L.
Calculation of confidence limits of monthly rainfall.
J. agric. Sci., 1956, **47**: 154-6, bibl. 3.

The author compares his method of calculation of rainfall uncertainty with that of Glover and Robinson [see *H.A.*, 24: 2189] and claims that his method gives a more precise analysis of monthly rainfall data.—Cotton Res. Stat., Namulonge, Uganda.

2342. SESTOFT, I.
A difference-method for predicting night-frost.
Neth. J. agric. Sci., 1956, **4**: 118.

A formula is presented whereby the minimum temperature for the coming night can be estimated. It has been tested with fairly good results in Denmark.—Danske met. Inst., Copenhagen.

2343. RENTSCHLER, W.
Untersuchungen zur Frostverteilung im Ingelfinger Weinberg. **(Studies on the distribution of frost in the Ingelfingen vineyard.)**
Neth. J. agric. Sci., 1956, **4**: 119-21, bibl. 3.

Temperature measurements taken at various positions in a 40-hectare hillside vineyard during night frosts in the spring of 1954 are recorded.—Inst. Phys. Met. landw. Hochsch., Hohenheim.

2344. HOGG, W. H., AND IBBETT, W. C.
Wind shelter for horticultural crops.
Agriculture, Lond., 1956, **62**: 587-90, bibl. 8, illus.
HOGG, W. H.
Taming the wind.
Comm. Gr, 1956, No. 3147, p. 665, illus.

In the first paper an account is given of the principles of small-scale wind shelter and of recent investigations into the relative advantages of solid and permeable barriers. British experiments with horticultural crops have shown, in preliminary results, that a permeable screen of laths or wire netting is more effective in reducing the air-flow without causing turbulence than a solid screen of straw bales. Permeable screens also cause less obstruction to sunshine and rainfall.

In the second paper a brief account is given of trials being carried out at 4 N.A.A.S. Experimental Horticulture Stations with permeable and solid shelter belts.

2345. (WOODRUFF, N. P.)
Formulas for shelterbelts.
Agric. Res. Wash., 1956, **4**(8): 11.

Tree grouping schemes, and the placing of shelterbelts to prevent soil erosion and to protect crops, livestock and buildings are discussed.

2346. NAEGELI, W.
Le problème de la protection contre les vents, son application en Israël. (The problem of protection from wind, its application in Israel.) [Hebrew pp. 5-14.]
La-yaaran, 1956, **6**(1-2): 36-28.*

The author discusses some effects of windbreaks. In Israel windbreaks are widely used to protect perennial crops, particularly fruits. They are usually orientated N/S, although secondary E/W windbreaks are sometimes needed. Temporary windbreaks are used for bananas, and tall banana varieties are often grown to protect Cavendish bananas. Other temporary windbreak plants are Provence reeds or *Sesbania aegyptiaca*; Napier grass also appears promising. Permanent windbreaks generally consist of a single line of trees around the plantation, the horizontal cypress being the best species to use.

2347. ZIMMERMAN, P. W., AND HITCHCOCK, A. E.
Susceptibility of plants to hydrofluoric acid and sulfur dioxide gases.
Contr. Boyce Thompson Inst., 1956, **18**: 263-79, bibl. 12, illus.

The effects of hydrofluoric acid (HF) and sulphur dioxide (SO_2) gases were determined and compared on 49 plant species. At given concentrations and periods of exposure some species were susceptible to HF but resistant to SO_2, and some species susceptible to SO_2 were resistant to HF. A few species were equally susceptible to both gases, and some were equally resistant. In tests with HF alone, concentrations of the gas ranged from less than 1 to 100 parts per [American] billion (10^9), by volume, and periods of exposure were usually 6–8 days. The concentration for SO_2 gas ranged from 0·2 to 1·1 p.p.m. (10^6) and the periods of exposure were 2–8 hours. Stomatal counts for upper and lower epidermis of leaves showed no relationship between number of stomata per unit leaf area and relative susceptibility to either gas. All plant species grown in pots or under field conditions stored fluorine. A few, such as *Cornus florida*, *Deutzia* sp., *Dichapetalum cymosum* and *Camellia* sp., accumulated abnormally large amounts of fluorine in the leaves. There were considerable differences in rate of absorption by different species when the plants were fumigated, and different parts of the plant absorbed different amounts of fluoride. [From authors' summary.]

2348. ADAMS, D. F., AND OTHERS.
Relationship of atmospheric fluoride levels and injury indexes on gladiolus and Ponderosa pine.
J. agric. Food Chem., 1956, **4**: 64-6, bibl. 8.

Gladiolus and Ponderosa pine were used as test plants in atmospheric exposures at 3 sites within an area of F pollution, and resultant damage was related to the average atmospheric F levels. A linear correlation was found to exist between the extent of leaf damage produced under field conditions and the average atmospheric exposure conditions. Of the 2 species gladiolus was the more sensitive to low concentrations of atmospheric F, while Ponderosa pine showed a more marked response to higher F levels in the atmosphere.—St. Coll. Wash., Pullman.

* This is correct.—Editor.

Soil and water.

(*See also* 2413, 2793, 3063, 3232.)

2349. LUNT, H. A.
The use of woodchips and other wood fragments as soil amendments.
Bull. Conn. agric. Exp. Stat. **593**, 1955, pp. 46, bibl. 22, illus.

Studies were conducted over a 5-year period to determine the effectiveness of woodchips and sawdust for soil improvement. The materials were incorporated in the soil or used as a mulch in pot-, frame- and field-experiments. Crops tested included lettuces, radishes, beets, spinach, snapdragons, seedling conifers and young apple trees. Results showed that the materials had no appreciable effect on soil acidity and were not toxic to plants. They had a slight favourable effect on soil structure and organic matter content. When fresh, chips almost invariably reduced first crop growth and were not consistent in their effect on succeeding crops. When supplemented with sufficient N or when composted before application chips did not decrease first crop yields and generally increased yields of succeeding crops. They appeared to be more effective on sandy soils than on loams. Birch chips decomposed more rapidly than oak or pine and required more N to prevent deficiency.

2350. WIEBE, J.
Phytotoxicity as a result of heat treatment of soil.
Diss. Abstr., 1956, **16**: 7, being *Publ.* 15438 of 95 pp.

Studies with a heat-sterilized soil, using cucumber as a test plant, have led the author to believe that the temporary growth retardation after treatment may be attributed to an increase in osmotic concentration of the soil solution.

2351. PENMAN, H. L., AND OTHERS.
Proceedings of the informal meeting on physics in agriculture, Wageningen, the Netherlands, 7-13 Sept., 1955.
Neth. J. agric. Sci., 1956, **4**: 1-161, bibls, illus.

Evaporation in agriculture was the main subject under discussion at this international meeting. An introductory survey by H. L. Penman was followed by 12 short communications on the subject by specialists from various countries and by discussions. Other communications on miscellaneous subjects included soil moisture determination and frost studies. [See also separate abstracts.]

2352. HALKIAS, N. A., VEIHMEYER, F. J., AND HENDRICKSON, A. H.
Determining water needs for crops from climatic data.
Hilgardia, 1955, **24**: 207-33, bibl. 47, illus.

The best measure of water use by crops is found by soil sampling to obtain the changes in soil moisture. Reproducible results are obtained by this method, if there is a long, rainless period during the growing

season and if the irrigations are far enough apart for at least 3 samplings to be obtained between waterings. The difference in evaporation between black and white atmometers has shown a high correlation with the use of water by crops and also with the solar radiation as measured by an Eppley pyrheliometer. Loss of water from a given area is associated with the energy received from the sun and with the ground coverage of the plants, so long as the soil moisture is above the permanent wilting percentage. Rates of water use by crops may vary from year to year, but if the ground coverage is equal the use is the same in any given year regardless of the size of the individual plants. Large differences in loss of water by crops may, however, occur if the extent of the coverage of the ground by the plant differs. The correlation between evaporation from a white atmometer and from a standard United States Weather Bureau pan suggests that the former could be substituted for the latter for measurement of evaporation.

2353. GARTON, J. E., AND CRIDDLE, W. D.
Estimates of consumptive-use and irrigation water requirements of crops in Oklahoma.
Tech. Bull. Okla A. & M. Coll. **T-57**, 1955, pp. 26, bibl. 2.

The purpose of this bulletin is to suggest figures on consumptive water requirements of crops for the various areas of Oklahoma. The estimates are based largely on studies made in other areas of the western U.S.A., the procedure being to correlate existing consumptive-use data with monthly mean temperature, per cent of daytime hours and precipitation for the frost-free period or irrigation season. The coefficients so obtained for different crops are used to transfer consumptive-use data from one section to other areas where only climatological data are available.

2354. NEALE, F. E.
Transpiration of glasshouse tomatoes, lettuce and carnations.
Neth. J. agric. Sci., 1956, **4**: 48-56, bibl. 5, illus.

The relationship between the transpiration from glasshouse crops and the total incoming radiation is shown graphically for tomatoes, lettuce and carnations. Daily values of transpiration and radiation are plotted for all three crops, the results including readings taken in winter as well as summer months and also illustrating the effect of incomplete vegetative cover of the glasshouse area. In addition hourly values of radiation and transpiration of tomatoes and carnations measured over two-day periods during the summer are presented. [Author's summary.]—Nat. Inst. agric. Engng, Silsoe.

2355. LUNN, W. A., AND HALL, A. D.
Use of plastic siphons for contour irrigation.
N.Z. J. Agric., 1956, **92**: 72, illus.

Plastic tubes of 2 in. (or greater) diameter can be used for discharging water from contour ditches. To lift 1 cu.-sec. of water 12–15 tubes are required. They can be spaced 10–15 feet apart.

2356. STOWER, J. S.
Overhead irrigation. Water supplies and distribution from source to sprinkler.
World Crops, 1956, **8**: 134-6, illus.

Methods are described for estimating the rate of flow of water in streams to be used for irrigation purposes. Permanent and portable systems of overhead irrigation are discussed. [For an earlier article see *H.A.*, 25: 3487.]

2357. HALL, W. A., AND BOVING, P. A.
Non-circular orifices for sprinkler irrigation.
Agric. Engng St. Joseph, Mich., 1956, **37**: 27-9, bibl. 5, illus.

In tests triangular, sharp-edged orifices offered promise for sprinkler irrigation. They are susceptible to wind drift, especially at higher pressures, but they give a much greater uniformity of droplet size and distribution can be controlled by the orifice shape.—Swift Current exp. Stat., Sask.

Nutrition.

(*See also* 2415t, 2416g, 2832, 2844, 2870, 3006, 3043, 3052, 3057, 3060, 3062, 3136, 3138, 3152, 3159, 3195, 3201, 3220.)

2358. BOULD, C.
Horticulture.
Reps Progr. appl. Chem., 1954, **39**: 666-75, bibl. 52.

The author reviews fruit work under the following headings: nutrition, soil plant relationships, nutrient deficiencies and excesses, iron chelates, foliage sprays. He deals also with the progress of investigations into nutrient deficiencies and excesses of vegetable and glasshouse crops.

2359. GUSTAFSON, F. G.
Absorption of Co^{60} by leaves of young plants and its translocation through the plant.
Amer. J. Bot., 1956, **43**: 157-60, bibl. 14.

The absorption of Co from a radioactive cobalt chloride solution by leaves of bean and cucumber seedlings was increased by increased light intensity, by increased temperature and by the addition of S/V Sovaspray 100 to the isotope solution, but was decreased by the wilting of the plants. Absorption, but no translocation, occurred in plants that had been kept in the dark for 24–72 hours, but when sucrose, glucose, fructose or maltose was added to the applied solution there was considerable absorption and translocation, though less than occurred in plants receiving light. Glycine and mannitol added to the isotope solution did not increase translocation.—Univ. Michigan, Ann Arbor.

2360. HAERTL, E. J., AND MARTELL, A. E.
Metal chelates in plant and animal nutrition.
J. agric. Food Chem., 1956, **4**: 26-32, bibl. 13, illus.

The authors review the present state of knowledge on metal chelates in plant and animal nutrition. Recent evidence has shown that the iron chelate is absorbed as a whole into the plant, and the authors suggest that in the leaf the chelating agent is destroyed by sunlight. and Fe is thereby liberated for use in plant metabolism, —Dow Chem. Co., and Clark Univ., Worcester, Mass.

2361. BEAR, F. E. (Editor).
Molybdenum in plant and animal nutrition.
Soil Sci., 1956, **81**(3): 159-258, bibl. 392.

Vol. 81, No. 3 is entirely devoted to Mo in plant and animal nutrition. It contains a bibliography of 392

references; coloured photographs of Mo deficiency in hibiscus, lettuce, bean, grapefruit, tobacco, cauliflower, broccoli, tomato and cucumber; and 9 papers [5 of which are abstracted or noted in this number of *H.A.*].

2362. Evans, H. J.
Role of molybdenum in plant nutrition.
Soil Sci., 1956, **81**: 199-208, bibl. 6 (plus numerous refs. in consolidated bibl. on pp. 243-58).

From a review of the role of Mo in plant metabolism, it is concluded that Mo is an essential element in the process of nitrogen fixation, and in nitrate reduction in plants when this source of nitrogen is utilized. It is, however, not a role which is limited to these two physiological processes, for plants grown upon combined nitrogen sources other than nitrate still require Mo for normal growth. The magnitude of the Mo requirement for nitrogen fixation and nitrate reduction is greater than that for the utilization of the reduced combined nitrogen sources. Mo is an essential constituent of hydrogenase and the possibility is discussed that a molybdoflavoprotein similar to hydrogenase plays a role in nitrogen fixation by symbiotic bacteria analogous to that proposed for hydrogenase in certain free-living micro-organisms. Other subjects covered are the functions of Mo as an electron carrier in certain flavoprotein-nitrate reductases, a phenomenon which accounts for the accumulation of nitrate in tissues of plants that are deficient in Mo, and in the inhibition of plant phosphatases. [From author's summary.]—N.C. St. Coll.

2363. Hewitt, E. J.
Symptoms of molybdenum deficiency in plants.
Soil Sci., 1956, **81**: 159-71, numerous refs. (in consolidated bibl. on pp. 243-58), illus.

The author reviews the symptoms of Mo deficiency in various leaf, root and fruit vegetables, myrobalan, lemon, tobacco and cacao. Loss of chlorophyll, mottling, wilting, necrosis and scorching symptoms are invariably associated with the use of nitrate in culture experiments and are independent of the presence of additional ammonia. The mottling is associated with an accumulation of nitrate or oxidizing compounds and localized distribution of molybdenum in the leaves. By inference, plants showing mottling and necrosis in the field are accumulating nitrate. Chlorophyll production is not decreased by molybdenum deficiency in the absence of nitrate.—Long Ashton Res. Stat.

2364. Tyszkiewicz, E., and Bąkbier, G.
Étude au moyen de P^{32} de la migration et de la répartition du phosphore dans la plante. Essais préliminaires. **(Studies on phosphorus translocation and distribution in the plant by means of P^{32}. Preliminary tests.)**
Ann. agron., 1956, **6**: 748-50.

Radioactive P was supplied to tomato plants 6 to 8 weeks old through the roots or through a cut petiole. Forty-eight hours after root application 95% of the P^{32} was detected in the roots, 4% in the stem and 1% in the leaves. Fifteen minutes after petiole application 50% of the P^{32} present in the entire plant was detected in the stem below the treated petiole; after 24 hours 11% of the P^{32} was found in the roots. No activity was found in the side of the stem opposite the treated petiole 1 min. after application.

2365. Biddulph, S. F.
Visual indications of S^{35} and P^{32} translocations in the phloem.
Amer. J. Bot., 1956, **43**: 143-8, bibl. 4, illus.

Radioactive S and P were applied to Red Kidney bean plants by injection or by a foliar spray. Autoradiographs showed that downward movement of S^{35} and P^{32} occurred principally in the phloem of the vascular traces from the treated leaf. Where activity was heaviest there was some lateral movement through living cells to the xylem. The phloem of a major bundle does not necessarily function as a unit in translocation.—St. Coll. Wash., Pullman.

Physiology and biochemistry.

(*See also* 2362, 2415c, d, f, j-n, r, u-w, z, 2416a-c, e, 2520, 2786-2788, 2791, 2882-2887, 2908k, 2913, 2918, 2973, 2982, 3119s, 3133, 3158, 3182, 3183, 3191m, 3192b.)

2366. Wiggans, S. C., and Shaw, R. H.
Effect of fluorescent and incandescent light on temperatures in photoperiodic chambers.
Iowa St. Coll. J. Sci., 1955, **30**(1): 139, bibl. 6, illus., from abstr. in *Agric. hort. engng Abstr.*, 1956, **7**, No. 170.

At 12–35 in. from the light source leaves exposed to 100-watt fluorescent lighting were slightly warmer than those exposed to similar incandescent lighting, but at 2 in. away they were 10–15° F. cooler.

2367. Holdsworth, M.
Leaf movements and the *Tagesrhythmik* explanation of photoperiodism.
Nature, 1956, **177**: 845-6, bibl. 8.

A criticism of Bünning's hypothesis of the relationship between day-length responses and diurnal rhythms as manifested by leaf movements.—Univ. Coll., Gold Coast, Achimota.

2368. Penka, M., and Rypáček, V.
Vliv délky dne na kvalitativní změny organických kyselin v obsahu šťávy buněčné rostliny *Begonia rex*. **(The effect of day length on the qualitative changes in organic acids in the cell sap of *Begonia rex*.)** [English and Russian summaries 7 lines each.]
Preslia, 1955, **27**: 424-36, bibl. 23.

From the results presented it is concluded that during day time and under unfavourable conditions the plant produces high-energy-yielding organic acids such as citric and *iso*-citric acids, whereas during the night and when it requires less energy it produces low-energy-yielding organic acids such as oxalic, malonic and succinic acids.

2369. Voskresenskaja, N. P., and Grišina, G. S.
Radioactive CO_2 utilization by plants under different conditions of illumination. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1956, **106**: 565-8, bibl. 4.

Leaves of sugar beet, sunflower and a short- and long-day species of tobacco were placed for 30–40 min. in diffused light and then exposed in $C^{14}O_2$ to blue light of 400–575 μ and red light of 580–720 μ for from 5 sec. to 10 min. All plants showed a similar reaction to the quality of the light, carbohydrate synthesis being inhibited by blue light.

2370. Appleman, D., and Pyfrom, H. T.
Changes in catalase activity and other responses induced in plants by red and blue light.
Plant Physiol., 1955, **30**: 543-9, bibl. 15, illus.

In etiolated barley seedlings and other grains catalase activity is greatly depressed by blue light and elevated by red light. This is also true for young tomato and tobacco plants grown in normal daylight and illuminated with coloured light for 3 to 6 days. Catalase in legumes (beans, peas and clover) was increased by irradiation with blue light and decreased by red light. Quantitative changes, due to red or blue light, in the Hill reaction and in ascorbic acid and protein content are reported. The probable significance of catalase in biosynthetic processes is discussed. [From authors' summary.]—Univ. Calif., Los Angeles.

2371. Kenten, R. H., and Mann, P. J. G.
The oxidation of manganese by illuminated chloroplast preparations.
Biochem. J., 1955, **61**: 279-86, bibl. 21.

The results are given of investigations on tobacco, spinach, pea and broad bean. It was found that chloroplast preparations oxidize Mn^{2+} in light but not, or to a much smaller extent, in darkness. It is suggested that the oxidation is due, at least in part, to peroxidase systems and that a manganese oxidation-reduction cycle may play a part in the reactions of photosynthesis.—Rothamsted Exp. Stat.

2372. Čaĭlahjan, M. H., and Bojarkin, A. N.
The effect of day length on the activity of the oxidising enzymes in plants. [Russian.]
Doklady Akad. Nauk. SSSR., 1955, **105**: 592-5, bibl. 17.

(1) Day length had a similar effect on the activity of the oxidizing enzymes peroxidase and polyphenoloxidase in the shoot apex, leaves and roots of plants, indicating that a plant reacts to day length as a single organism. (2) Peroxidase activity in all plants, irrespective of their photoperiodic reaction, was higher under short-day conditions than under long, from which it is concluded that generative development in long-day species begins at a relatively lower rate of peroxidase activity than in short-day species. The test plants used included tobacco, chrysanthemum, bean, cabbage and tomato.

2373. Smillie, R. M.
Enzymic activities of sub-cellular particles from leaves. I. The occurrence of mitochondria in green leaves of the pea plant.
Aust. J. biol. Sci., 1956, **9**: 81-91, bibl. 23.

Cytoplasmic particles corresponding to the mitochondria of animal and etiolated plant tissues have been prepared from green pea leaves. These particles contain the complete tricarboxylic acid cycle complex of enzymes. [From author's summary.]—Dep. Biochem., Univ. Sydney.

2374. Jensen, W. A.
The cytochemical localization of acid phosphatase in root tip cells.
Amer. J. Bot., 1956, **43**: 50-4, bibl. 10, illus.

The intracellular distribution of acid phosphatase was studied in frozen-dried root tips of *Allium cepa*, *Vicia faba* and *Pisum sativum* by a modification of the Gomeri technique. The sites of activity are spherical (0·6 μ) or rod-shaped (0·6×1·2—2·0 μ) cytoplasmic particles containing small amounts of ribonucleic acid and large amounts of lipids. These particles are concluded to be mitochondria. [Author's summary.]—Calif. Inst. Technol., Pasadena.

2375. Tookey, H. L., and Balls, A. K.
Plant phospholipase D. I. Studies on cotton-seed and cabbage phospholipase D.
J. biol. Chem., 1956, **218**: 213-24, bibl. 22.

Phospholipase D, which hydrolyzes phospholipide to release free nitrogen base and phosphatidic acid, occurs in such unrelated plants as cabbage, hevea and maple. Observations were made on pH optimum, stability, specificity, effect of NaCl and, in the case of cabbage, a naturally occurring inhibitor.—Purdue Univ., Lafayette, Indiana.

2376. Brachet, J.
The mode of action of ribonuclease on living root-tips.
Biochim. biophys. Acta, 1956, **19**: 583, bibl. 3.

In experiments on living onion roots ribonuclease produced, in 24 hours, an 86% inhibition of growth in length and an 89% inhibition of protein synthesis. The mechanism of the action is discussed.—Univ. Bruxelles.

2377. de Capite, L.
Influenza dei traumi da ferita sui valori della respirazione. **(Effect of injuries on respiration rate.)**
Ann. Fac. Agrar. Perugia, 1953, **9**: 96-9, bibl. 1.

The respiration rates of cut and entire leaves of 14 useful or ornamental plants including tomato, tobacco and persimmon were determined in tests with 2 types of respirometer. In all cases the respiration rate was appreciably higher in injured than in entire leaves.

2378. Skoss, J. D.
Structure and composition of plant cuticle in relation to environmental factors and permeability.
Bot. Gaz., 1955, **117**: 55-72, bibl. 32, illus.

Studies were made on the leaf cuticles of lemons, *Clivia nobilis*, *Hoya carnosa*, *Hedera helix*, *Nicotiana glauca*, *Agave americana* and *Pittosporum tobira*. Cuticle deposition was continuous until the leaf reached morphological maturity, after which no further deposition occurred. Leaves grown in the sun produced heavier cuticles of greater wax content than did shade-grown leaves. The most cuticle was produced at a medium temperature, and the greatest percentage of wax at a high temperature. The permeability of cuticle to water in an *in vitro* system was directly correlated with the amount of impregnating waxes. *In vivo* experiments indicated that the nature of the

substance sprayed and the presence or absence of stomata on a particular leaf were largely responsible for the amount and penetration of sprayed substances into a plant.—Univ. Calif., Los Angeles.

2379. Lott, J. R., and Rosene, H. F.
Effects of 4,6-dinitro-*o*-cresol on water influx and oxygen uptake of excised onion roots.
Amer. J. Bot., 1956, **43**: 69-72, bibl. 19.

Concentrations of 5×10^{-4} M, 5×10^{-5} M and 5×10^{-6} M of dinitro-*o*-cresol resulted in increased rates of water influx and oxygen uptake. These results support the conclusion that the two processes are related and that water influx into excised onion roots is dependent on cell metabolism.

2380. Goodwin, T. W.
Studies in carotenogenesis. 19. A survey of the polyenes in a number of ripe berries.
Biochem. J., 1956, **62**: 346-52, bibl. 33.

The complete polyene distribution has been determined for berries of 23 species, many of them ornamental plants, representing 8 families.—Univ. Liverpool.

2381. de Capite, L.
La coltura dei frutti *in vitro* da fiori recisi di *Fragaria chiloensis* Ehrh. × *F. virginiana* Duch. var. Marshall e di *Pisum sativum* L. var. Zelka. **(Fruits cultured *in vitro* from excised flowers of *Fragaria chiloensis* × *F. virginiana* var. Marshall and *Pisum sativum* L. var. Zelka.)**
Ric. sci., 1955, **25**: 532-8, from abstr. in *Biol. Abstr., Sect. D*, 1956, **30**, No. 8603.

Fruits have been obtained from *in vitro* cultures of excised flowers of *F. chiloensis* × *F. virginiana* and *Pisum sativum*. The anatomical characters of these fruits were identical with those on the parent plants. The results suggest that it may be advantageous to use the *in vitro* technique for the study of fruit physiology.

Growth substances.

(*See also* 2415b, f, q, 2533, 2758, 2781, 2794, 2825, 2845, 2846, 2888, 2889, 3075-3077, 3112.)

2382. Luckwill, L. C.
Two methods for the bioassay of auxins in the presence of growth inhibitors.
J. hort. Sci., 1956, **31**: 89-98, bibl. 19, illus.

Two methods for the bioassay of auxins are described. One of these is based on the ability of auxins to delay the abscission of de-bladed petioles of *Coleus blumei*; the other on their ability to promote root formation on the hypocotyls of *Phaseolus vulgaris*. The chief advantage of these tests is that they are relatively insensitive to the growth inhibitors which occur in extracts of plant tissues, and which frequently interfere with auxin assays carried out by the more conventional methods based on cell extension response. [From author's summary.]—Long Ashton Res. Stat.

2383. Gaur, B. K., and Leopold, A. C.
The promotion of abscission by auxin.
Plant Physiol., 1955, **30**: 487-90, bibl. 15.

The relative effectiveness of different concentrations of NAA in controlling petiole abscission was studied with distal and proximal application, using *Coleus* and bean as test plants. High concentrations inhibited abscission, and treatment with 1,000 p.p.m. was enough to delay the abscission of young petioles for 1 month. Auxin applications of 1 and 10 p.p.m. caused marked promotion of abscission. The differences in the effects of application at distal or proximal positions were quantitative rather than qualitative. The quantity of auxin applied and not the auxin gradient controlled abscission.—Purdue Univ., Lafayette, Indiana.

2384. Krewson, C. F., and others.
Amino acid derivatives of 4-chlorophenoxyacetic acid and their plant-regulating effects in preliminary screening tests.
J. agric. Food Chem., 1956, **4**: 140-3, bibl. 29.

A series of new D-, L-, and DL-amino acid derivatives of 4-chlorophenoxyacetic acid was prepared and screened for plant-growth regulating activity. In general, the derivatives of DL- and L-amino acids proved to be active plant-growth regulators when tested on Black Valentine bean, sunflower, cucumber, barley and corn plants; those of D-amino acids were less active and more selective. [From authors' summary.]—East. reg. Res. Lab., Philadelphia, and Agric. Res. Serv., Beltsville, Md.

2385. Toponi, M.
Azione dell'acido *p*-aminobenzoico e α-aminovalerianico sui tessuti tumorali di *Scorzonera hispanica* coltivati *in vitro*. **(Effect of *p*-aminobenzoic and α-aminovalerianic acid on tumour tissue of *Scorzonera hispanica* cultured *in vitro*.)**
Ann. Fac. Agrar. Perugia, 1953, **9**: 321-5, bibl. 9.

The development of tumour tissue was increased by each of the 2 acids applied separately, but was reduced by them in combination.

2386. Capozzi, A.
Acido folico e proliferazione cellulare in tessuti vegetali coltivati *in vitro*. **(Folic acid and cell proliferation in plant tissues cultured *in vitro*.)** [English summary 6 lines.]
Atti Ist. bot. Univ. Pavia, 1954, **10**: 211-16, bibl. 11.

A study was made of the effect of folic acid (pteroylglutamic acid) at concentrations of 10^{-4} to 10^{-6} on cell multiplication, either natural or induced by β-indoleacetic acid, in normal plant tissue and in tobacco crown gall tissue cultured *in vitro* and on lupin in Macht's test. In the dark PGA had an inhibiting effect on cell multiplication and reduced the stimulatory effect of IAA. In the light it caused increased proliferation, a phenomenon attributed to the presence, among the products of hydrolysis of PGA, of *p*-aminobenzoic acid which stimulates cell multiplication.

2387. Kato, Y.
Responses of plant cells to gibberellin.
Bot. Gaz., 1955, **117**: 16-24, bibl. 14.

Gibberellin at a concentration of 0·01–10·0 mg./l. markedly accelerated coleoptile growth of *Allium fistulosum*. At a concentration of 100 mg./l. pseudochiasmata formation and induction of mitosis occurred

in the more differentiated cells of *A. cepa* roots. At a concentration of 10 mg./l. or less, which stimulated coleoptile growth, no visible cytological effects were detected. Gibberellin accelerated pollen germination and pollen-tube growth of *Lilium longiflorum*. From studies on stems of *Vigna sesquipedalis* seedlings treated with lanolin containing 0·01% gibberellin, it is concluded that growth stimulation is in a longitudinal direction and that elongation is the result of accelerated cell elongation rather than cell multiplication. The physiological effects of gibberellin are shown to be quite different from those of indole-3-acetic acid. It is suggested that gibberellin is a type of growth regulator not toxic to protoplasm, and that hyperelongation may be a reaction specific only to gibberellin among growth-regulating substances.—Nagoya Univ., Japan.

2388. Moreland, C. F.
Experiments on bean plants grown in light *versus* darkness.
Proc. Louisiana Acad. Sci. 1954, **17**: 85-9, from abstr. in *Biol. Abstr., Sect. D*, 1956, **30**, No. 8632.

The effect of maleic hydrazide was studied on the growth of bean plants in light and in darkness. The results indicated that inhibition of elongation of internodes and petioles of treated plants is due to the effect of MH on the phloem and its consequent interference with translocation of food from the cotyledons or leaves to these parts.

2389. Sapožkov, I. A.
Potassium permanganate—a growth stimulator. [Russian.]
Priroda, 1956, **45**(2): 93-4.

It is claimed that potassium permanganate solutions (0·25 to 0·5 g. in 10 l. water) have improved the growth of fruit trees, induced earlier and better rooting of black currant cuttings, increased vegetable yields and have provided a very satisfactory treatment for vegetable seeds. [No detailed results are given.]

2390. Mayer, A. M.
The action of thiourea as a germination stimulator.
J. exp. Bot., 1956, **7**: 93-6, bibl. 7.

Thiourea was found not to be metabolized by the seeds of the light-sensitive lettuce variety Grand Rapids during germination, despite its action in abolishing their light requirement. Substitution in the thiourea molecule converted it from a stimulatory to a strongly inhibitory substance.—Hebrew Univ., Jerusalem.

2391. Grebinskiĭ, S. O., Ljukova, L. A., and Friško, K. N.
Effect of vitamins on the breaking of dormant buds. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1955, **105**: 1361-3, bibl. 4.

Branches of apples, chestnuts, lilacs, magnolias and some other species were injected with vitamin B_1 (thiamine) and vitamin PP (nicotinic acid) and then stood in water at 25–30° C. under low light intensity. Buds on the branches injected with vitamins began to break 2 to 4 weeks earlier than those on similar branches injected with distilled water. The treatment had a stimulating effect on respiration and this may be partially responsible for the early breaking of dormancy.

Seeds.

(*See also* 2389, 2390, 2407, 2432, 2504p, 2796-2800, 2815, 2817-2819, 2822, 2836, 2837, 2866d, g, m, 2880, 2955, 2987, 2988, 3019, 3041 l.)

2392. Janíček, G.
O možnostech využití nového, dosud nepopsaného luminiscenčního zjevu při identifikaci semen. **(On the possible use of a previously unobserved phenomenon of luminescence for seed identification.)** [Russian and English summaries 12 and 16 lines respectively.]
Sborn. čsl. Akad. Zeměd., 1955, **28**: 829-40, bibl. 11.

A method involving the use of basic lead acetate has been developed to produce luminescence in aqueous extracts of certain seeds, including vegetables and flowers. The different reactions of aqueous extracts of different seeds may be used in identification tests.

2393. Pfeifer, R. P., Bergman, R. J., and Sparks, J. E.
Photoelectric seed counter.
Agron. J., 1956, **48**: 91-2, illus.

A seed counter is described which provides swift and accurate counting of seeds or other small objects. Its accuracy depends on the ability of the feeder to separate and drop seeds one at a time. [Authors' synopsis.]—Agric. Exp. Stat., Laramie, Wyoming.

2394. Wiłkojć, A.
Zastosowanie podczerwieni do suszenia nasion. **(Seed drying by infra-red rays.)**
Post. Nauk roln., 1955, No. 2, pp. 112-22, from abstr. in *Polish tech. Abstr.* [in English and Russian], 1956, **1**(21), No. 4019.

The use of infra-red rays was found convenient for drying small lots of vegetable seeds. A description is given of a drier, the design of which was based on the results of tests with various sources of radiation, their distance from the seed and the duration of irradiation. The effects on the seeds of 2 methods of treatment, one consisting of ½ min. exposure and 10 min. cooling and the other of ½ min. exposure and 24 hrs cooling, both repeated 10 times, were studied and the results are tabulated.

2395. Lowig, E.
Beiträge zur Frage der Saatgutlagerung. **(Contributions to the problem of seed storage.)**
Saatgut-Wirtsch., 1955, **7**: 14-16 and separate reprint pp. 4, illus.

The author presents data on the loss of germination capacity in vegetable seeds (with the exception of beans and peas) as the result of storage in paper packets. Lettuce seeds were more adversely affected than seeds of other vegetables. Until more is known about the factors responsible for the reduction in germination, seed should be put into paper packets at the last possible moment. In the separate article means of maintaining a low humidity in containers for seed storage are discussed. [For earlier papers see *H.A.*, 25: 65.]

2396. KLEIN, S.
A simple potometer for measuring rate of water uptake by small seeds.
Nature, 1956, **177**: 707-8, bibl. 1, illus.

The potometer consists of a Petri dish with a ground edge and with a capillary tube leading from the middle of its base to a beaker of water. It is covered with a ground glass plate with a small central hole through which the seed sample is inserted and which can be quickly closed with a cover glass and sealed.—Hebrew Univ., Jerusalem.

2397. RUGE, U.
Keimschwankungen bei gärtnerischen Kulturpflanzen im Jahreszyklus. (**Fluctuations in the germination of horticultural plants within the annual cycle.**)
Gartenbauwiss., 1955, **2**: 291-300, bibl. 18.

Of 10 vegetables and 9 flowers tested under constant conditions only the seed of *Iberis amara* showed a certain seasonal rhythm in percentage and rate of germination. Fluctuations observed in other seeds were attributable to different causes. These findings suggest that such a rhythm is less common in cultivated than wild plants. The results also show that a constant value for the germination of mature seed can be expected only when the particular requirements of a species or variety have been met and provided that optimum conditions prevailed while the seed was still on the parent plant. Experience indicates that percentage and rate of germination have an influence on the vigour of the seedling. More attention should therefore be paid to rhythmical and arhythmical fluctuations in the viability of stored seeds.

Statistical design.

2398. STRZEMIEŃSKI, K.
A combinatorial design for experiments with alternative responses.
Nature, 1956, **177**: 283.

It is pointed out that where a number of treatments are being tried to see whether any of them will produce a specified result—e.g., a number of nutrient solutions that may cure a certain form of chlorosis—the experiment need not be so large as where the effect of each is to be estimated separately. Subject to certain given conditions, $(n+1)$ tests will suffice for (2^n-1) treatments.

S.C.P.

2399. PEARCE, S. C.
Studies in the measurement of apple trees. III. The use of branch girths as a substitute for the trunk girth.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 76-9, bibl. 4.

A search is described for some quantity based on branch girths that may be used instead of trunk girth where the latter cannot be measured. It is shown [for apple trees] that, if the branch girths larger than 5 cm. are added together and divided by the square root of their number, a satisfactory substitute is obtained, though one that is of doubtful value in rootstock trials. [Author's summary.]

2400. HOLLAND, D. A.
Soil acidity in relation to trunk girth of apples.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 80-5, bibl. 10.

The limitations of detecting a relationship between soil pH and trunk girth of apple trees, imposed by the sampling error of soil pH, are considered. Assessments of the sampling error under different conditions are made and a preliminary test of the likelihood of detecting a correlation between soil pH and trunk girth is suggested. Three possible relationships between soil pH and trunk girth are studied. [Author's summary.]

2401. FREEMAN, G. H., AND BOLAS, B. D.
A method for the rapid determination of leaf areas in the field.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 104-7, bibl. 7, illus.

A method for the rapid estimation of leaf areas in the field is described. This method is applicable to all leaves which are approximately elliptical in shape. Sources of error have been examined, both in the laboratory and in a preliminary field test. It is suggested that the new method has certain advantages over techniques previously used for the estimation of leaf areas in cases involving large numbers of determinations. [Authors' summary.]

2402. FREEMAN, G. H.
The selection and use of a panel for taste sensitivity tests with fruit.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 86-8, bibl. 1.

The methods of selection and subsequent use of a panel for taste sensitivity tests with fruit are described. The selection procedure consisted of three series of trials, the first involving assessment of primary flavours, the second discrimination between fruits, and the third assessment of combinations of primary flavours. The panel selected on the basis of these trials and consisting of 6 to 10 members on any one occasion has subsequently been used to describe the flavours of fruits differing either in respect of variety or of some soil, cultural, spraying or storage factor. [Author's summary.]

Glass and plastic houses.

(*See also* 2415g, o, 2953, 2954.)

2403. BUSINGER, J. A.
Warme-luchtverwarming in kassen. (**Hot-air in greenhouses.**) [English summary 10 lines, p. 186.]
Meded. Dir. Tuinb., 1956, **19**: 144-50, bibl. 3, illus.

An account is given of the theory and practice of heating by hot air, and the advantages and disadvantages of some systems are discussed.

2404. KREUTZ, W., AND SCHUPP, F.
Die Steuerung des Gewächshausklimas durch Beeinflussung der Strömungsverhältnisse bei verschiedenen Lüftungsmethoden. (**Control of glasshouse climate by regulating the air currents by different methods of ventilation.**)
Gartenwelt, 1956, **56**: 105-7, 128-30, illus.

The climates of two glasshouses, in which different systems of ventilation were installed, were compared in great detail at Heidelberg. One had ridge ventilation and windows at the two sides, while the other was ventilated at the two gable ends only. The records presented show that the latter type was more efficient and that the side windows contributed little to the exchange of air with the atmosphere outside. In the gable-ventilated house the speed of the air currents was 1·3 m./sec., whereas that of the ridge-ventilated house was about 50% lower, with the result that the former was appreciably cooler. It is concluded that, especially in a large house where the rapid exchange of air is of major importance, ventilation at the gable ends has considerable advantages, quite apart from the saving in building cost. The illustrations include pictures of air currents made visible by smoke. Lettuce and tomatoes responded well to the relatively high air speed of 1·3 m./sec.—Hort. Coll. Exp. Stat., Heidelberg, and agromet. Inst., Giessen.

2405. Spice, H. R.
Condensation on plastic film linings.
Grower, 1956, **45**: 637-9, illus.

The dangers of condensation and drip from plastic-lined greenhouses may be minimised by applying the film in a smooth even fall from ridge to eaves. In orchid houses some growers have fixed a second film 1–2 inches below the first lining, to conduct the drips away from the plants. Complete lining is not recommended for tomato houses as it may encourage leaf mould. In a greenhouse with one half "glazed" with plastic, the temperature was 8° F. higher in the plastic half than in the glass half of the house.

2406. Germing, G. H.
Kunststof als materiaal ter vervanging van glas. **(Plastic materials to replace glass.)** [English summary 10 lines, p. 186.]
Meded. Dir. Tuinb., 1956, **19**: 141-5, illus.

Several factors affecting the use of polyvinyl chloride and polyethylene as glass substitutes are discussed. Less light is admitted by plastic than by glass, and the amount may be even further reduced by condensation. The initial cost of glass is greater than that of plastic but its life is much longer. In cultural experiments at the I.T.T., Wageningen, purslane and cucumber matured later under plastic frames than under glass. Tomatoes and beans, grown temporarily under plastic covers for frost protection, cropped earlier than did plants transplanted outside in mid-May.

Machinery and equipment.

(*See also* 2355, 2393, 2394, 2396, 2415k, p, 2454, 2487-2490, 2504h, o, 2736, 2865g, z, 2876, 2943.)

2407. The Commercial Grower.
Mechanisation in Horticulture, Spring 1956, No. 5, pp. 29-70, illus.

Articles in this issue include: mechanisation in mushroom growing; prepackaging of tomatoes; the orchard "monkey" or hydraulic platform; spraying machines; a Dutch bulb planter; the use of roller conveyors; seed sorting by electronics; a mechanical mushroom composter; electricity in the glasshouse; and the conversion of existing buildings to cold storage.

2408. Anon.
Slow-speed tractor attachment.
World Crops, 1956, **8**: 165.

A Hydra-Creeper attachment is available for the Farmall 400 tractor. It provides 4 creeper speeds, ranging from 0·2 to 1·0 m.p.h. It is used primarily for transplanting vegetables, tobacco, flowers and nursery stock, for planting flower bulbs and for special harvesting jobs where slow speeds are essential.

2409. Giacomelli, C.
Un attrezzo per il rapido piantamento delle pioppelle e delle talee di pioppo. **(A machine for the rapid planting of poplar seedlings and cuttings.)**
Agric. Venezie, 1956, **10**: 31-7, illus.

The machine is a steel-wheeled, tractor-drawn trailer fitted with a ploughshare adapted to the planting of seedlings and rooted cuttings of any tree species. The share, which operates to a depth of 60–70 cm., is flat-fronted and is not designed to turn the soil. Two parallel plates, 15 cm. apart, are fitted behind it to its outer edges, and the plants are dropped in between these by hand.

2410. Ministry of Agriculture, London.
Hot-water treatment of plants.
Adv. Leafl. Minist. Agric. Lond. **379**, 1955, pp. 5, illus.

The construction of a simple, cheap bath for the hot-water treatment of plants is described. The use of hot-water treatment for chrysanthemums, strawberry runners, narcissus bulbs, phlox, and mint runners is described.

2411. Anon.
Self-switch mist helps propagating.
Grower, 1956, **45**: 933-5, illus.

An electronic leaf for switching on and off mists used in propagation is described. It has been developed at the National Institute of Agricultural Engineering.

2412. Anon.
British-made machine for prepacking.
Comm. Gr, 1956, No. 3144, p. 443, illus.

The machine is primarily designed for bagging produce, but may be adapted for packing punnets or cartons. The basic machine costs £350 ex-works.

2413. Bouyoucos, G. J.
Improved soil moisture meter.
Agric. Engng St. Joseph, Mich., 1956, **37**: 261-2, bibl. 7, illus.

The meter was introduced in 1950 [see *H.A.*, 20: 1262]. Improvements embodied in the latest model are a transistor instead of vacuum tubes, an improved circuit which minimizes capacitance effects, a scale calibrated to give not only percentage of available water but also corresponding resistance in ohms, greater sensitivity throughout its range and improved plaster-of-paris blocks.

2414. Ermers, J. P. Z.
De vervaardiging van plastics. **(The manufacture of plastics.)** [English summary 7 lines.]
Meded. Dir. Tuinb., 1956, **19** 239-43, illus.

Detailed instructions are given for the making of small

transparent plastic cubes, in which insects or other demonstration specimens for use in horticultural education can be embedded.

Noted.

2415.

a DE BAKKER, G.
De tuinbouw langs de Middellandse Zee. **(Horticulture on the Mediterranean coast.)** [English summary 23 lines.]
Meded. Dir. Tuinb., 1956, **19**: 156-62, illus.
Vegetable and flower crops in Italy, S. France and N. Spain.

b BERTOSSI, F.
Antagonisti di crescita sintetici nel campo della coltura dei tessuti. **(Synthetic growth inhibitors in the field of tissue culture.)** [English summary 5 lines.]
Atti Ist. bot. Univ. Pavia, 1954, **10**: 297-308, bibl. 55.
A review.

c BERTOSSI, F.
Coltura di germinelli in soluzioni sterili su supporti di carta da filtro. **(The culture of seedlings in sterile solutions on filter paper.)** [English summary 2 lines.]
Atti Ist. bot. Univ. Pavia, 1954, **10**: 231-5, bibl. 5, illus.

d BROUWER, R.
Radiation intensity and transpiration.
Neth. J. agric. Sci., 1956, **4**: 43-8.
The relationship studied in *Phaseolus vulgaris*.

e CHEVELEY, S., AND PRICE, O.
Capital in United Kingdom agriculture: present and future.
Netherhall Press, London, 1955, pp. 54, bibl. 16, 2s. 6d.

f DE ZEEUW, D., AND LEOPOLD, A. C.
The promotion of floral initiation by auxin.
Amer. J. Bot., 1956, **43**: 47-50, bibl. 11.
By NAA on cocklebur and soya bean [see also *H.A.*, 26: 559].

g EDWARDS, R. I., AND HOARE, E. R.
Degree-days in relation to heat requirements of glasshouses.
[*Mimeo. Publ.*] *Dep. Note N.I.A.E.* **39**, 1954, pp. 2+25 graphs, bibl. 1.
Their calculation by formulae. [See also *H.A.*, 24: 3443m.]

h VAN EIMERN, J.
Über Schwankungen der Windschutzwirkung von Hecken und Baumreihen. **(Fluctuations in the degree of shelter provided by hedges and belts of trees.)**
Met. Rdsch., 1955, **8**: 122-7, from abstr. in *Gartenbauwiss.*, 1955, **2**, abstr. p. 55.
Fluctuations shown to be considerable.

i FORD, E.
Farming from the air—American experience.
World Crops, 1956, **8**: 148-50, illus.
The many uses of aircraft reviewed briefly.

j GAASTRA, P.
De methodiek van het fotosyntheseonderzoek. **(Methods of investigating photosynthesis.)**
Landbouwk. Tijdschr., 1956, **68**: 528-36, bibl. 13, illus.

k AP GRIFFITH, G., AND THOMAS, D. C.
A useful filtering device.
Lab. Practice, 1956, **5**: 178, illus.
For use in determining fibre in plant materials.

l GROB, R. L., AND YOE, J. H.
Determination of trace quantities of boron with two new colorimetric reagents. [French and German summaries 17 and 18 lines.]
Analyt. chim. Acta, 1956, **14**: 253-62, bibl. 10.
In the leaves of apple, cherry, citrus and peach.

m HANNA, W. J., AND PURVIS, E. R.
Techniques for determining the nutrient status of soils and crops.
Bull. N.J. agric. Exp. Stat. **780**, 1955, pp. 15, bibl. 12.

n HEMINGWAY, R. G.
The determination of calcium in plant material by flame photometry.
Analyst, 1956, **81**: 164-8, bibl. 11.

o HOARE, E. R.
Heat emission from pipes of various sizes from 1¼" diameter to 4" diameter.
[*Mimeo. Publ.*] *Dep. Note N.I.A.E.* **37**, 1954, pp. 2+tables.

p HOWE, R. W.
A method for obtaining a controlled daily temperature cycle.
Ann. appl. Biol., 1956, **44**: 188-94, bibl. 3, illus.
Apparatus described, for use in the laboratory.

q HUDSON, J. P.
Recent advances in plant propagation.
Agric. Rev., 1956, **1**(11): 38-41, bibl. 6, illus.
By cuttings.

r KURSANOV, A. L.
The utilization of radioactive isotopes in biology and agriculture in the USSR.
Sci. and Cult., 1956, **21**: 515-22.

s LAKE, J. V.
The temperature profile above bare soil on clear nights.
Quart. J. roy. met. Soc., 1956, **82**: 187-97, bibl. 24.
An investigation by the hort. Labs., Univ. Reading.

t LAVOLLAY, J.
Principes et conditions d'emploi des oligo-éléments essentiels en agriculture. **(Principles and conditions of use of the essential minor elements in agriculture.)**
Fruits d'Outre Mer, 1956, **11**: 95-104, bibl. 9.
Notes on Fe, Mn, Zn, Cu, B and Mo.

u LIEBERMAN, M., AND BIALE, J. B.
Effectiveness of ethylene diamine tetra-acetic acid in the activation of oxidations mediated by mitochondria from broccoli buds.
Plant Physiol., 1955, **30**: 549-52, bibl. 16.

v MANSFORD, K., AND RAPER, R.
The free and combined amino-acids in some plant juices.
Ann. Bot. Lond., 1956, **20**: 287-95, bibl. 27.
Including *Beta vulgaris* and *Malus sylvestris*.

w MAPSON, L. W., AND MOUSTAFA, E. M.
Ascorbic acid and glutathione as respiratory carriers in the respiration of pea seedlings.
Biochem. J., 1956, **62**: 248-59, bibl. 22.

x MILAD, Y.
The development of horticulture in Egypt.
[*Publ.*] *agric. Ext. Dep., Minist. Agric. Cairo*, 1955, pp. 9.
Including some acreage, import and export figures for fruits and vegetables.

y MILTHORPE, F. L.
Plant growth and the weather.
[*Publ.*] *Univ. Nottingham*, 1955, pp. 12, 1s. 6d.

z PURVIS, E. R., AND PETERSON, N. K.
Methods of soil and plant analyses for molybdenum.
Soil Sci., 1956, **81**: 223-8, numerous refs. (in consolidated bibl., pp. 243-58).

2416.

a SAPOZNIKOV, D. I., BRONŠTEĬN, I. A., AND KRACOVSKAJA, T. A.
Application of paper chromatography to the analysis of plastid pigments in green leaves. [Russian.]
Biohimija, 1955, **20**: 286-91, bibl. 6, illus.
Qualitative separation of pigments and quantitative determination of carotene.

b SMITH, A. M., AND MCCALLUM, E. S. R.
The determination of calcium and magnesium in plant material with disodium ethylenediaminetetra-acetate.
Analyst, 1956, **81**: 160-3, bibl. 13.

c STILES, W.
Plant physiology. Flower formation.
Sci. Progr., 1956, **44**: 284-92, bibl. 18.
A review of some recent work on the processes leading to flower formation.

d STOUT, P. R., AND JOHNSON, C. M.
Molybdenum deficiency in horticultural and field crops.
Soil Sci., 1956, **81**: 183-90, numerous refs. (in consolidated bibl. on pp. 243-58).
A review covering vegetables, citrus, hops, roses, tobacco, etc.

e STREBEYKO, P.
Próby mierzenia fotosyntezy przybytkiem wegla w roślinach. (**An attempt to measure photosynthesis by determining the increase of carbon in plants.** [Russian and English summaries 1 p. each.]
Roczn. Nauk rol., Ser. A, 1955, **71**: 221-38, bibl. 48.
Four methods tested.

f TRENK, F. B.
Shelterbelts.
Circ. Univ. Wis. Ext. Serv. **495**, 1955, pp. 6, illus.
Conifers.

g WAHHAB, A.
The role of plant nutrients and their deficiency symptoms.
Punjab Fruit J., 1955, **19**: 34-42, bibl. 19.
A review.

TREE FRUITS, DECIDUOUS.

General.

(*See also* 2402, 2415x, 2503d, f, i, j, n, o, z, 2504a, j, k.)

2417. MASSACHUSETTS.
Department of Pomology.
A.R. Mass. agric. Exp. Stat. 1953–1954, pp. 81-6.
Reports are included of work on the following: *Chemical thinning of apples and peaches:* Naphthaleneacetamide caused no injury to apple foliage at concentrations up to 50 p.p.m., and 2 applications were more effective in thinning McIntosh and Baldwin than a single application at petal-fall or later; CIPC was a promising post-bloom thinning agent for peaches, and did not injure their leaves at concentrations up to 200 p.p.m. *Tree fruit metabolism:* 2,4,5-T increased the rate of fruit ripening in apples, but the effect was reduced or eliminated by maleic hydrazide. *Apple nutrition:* Changes in nutrient levels supplied to McIntosh apples were reflected in leaf composition. *Varietal studies:* Melrose continued to show promise as a winter apple. *Raspberry:* Holding Latham canes at 40° F. for 3–5 days reduced resistance to low temperature injury. *Weed control:* In wild blueberry fields various forms of 2,4-D and 2,4,5-T were equally toxic to blueberries and poplars; Chloro-IPC did not injure cultivated blueberries and gave about 95% control of quackgrass (*Agropyron repens*) at 50 lb. per acre; Sesin gave fairly good control of weeds in strawberries at 4–6 lb. per acre; very good control of chickweed was obtained in the autumn by Chloro-IPC at 2 lb. per acre. *Beach plum:* Applications of a complete fertilizer had no effect on fruit set or terminal growth; brown rot was reduced to about 1% at harvest time by wettable S or fermate; hand-pollination resulted in a poorer fruit set than open-pollination.

2418. SOCIÉTÉ D'HORTICULTURE D'ANGERS.
Journée fruitière et centenaire de la poire Doyenné du Comice. (**Fruit conference and centenary of the Doyenné du Comice pear**), Angers, 1955, pp. 66, bibls, illus.
Among the articles of general interest is a summary of recent French work on apple and pear scab by H. Darpoux. In celebration of the centenary of the pear variety Doyenné du Comice articles on its com-

mercial culture in Spain, Belgium, Switzerland, south-eastern France and the Crimea are included.

2419. Anon.
Cultuur van vijgen in Nederland? (**Fig growing in the Netherlands?**)
Fruitteelt, 1956, **46**: 348-9, illus.

A note is given on the start of work on fig-growing in Aardenburg [Zeeland]. Varieties have been introduced from abroad, new seedlings have been raised, and colchicine is being used in breeding work. The varieties are being tested for frost resistance.

Breeding and varieties.

(*See also* 2417, 2418, 2503b, c, e, g, l, r, s, 2504g, m, q, y, 3205.)

2420. Morettini, A.
Attività del Centro Miglioramento Piante da Frutto e da Orto annesso all'Istituto di Coltivazioni Arboree dell'Università di Firenze. Quinquennio 1950–1955. (**Activities of the Fruit and Vegetable Breeding Centre at the Arboricultural Institute of the University of Florence during the quinquennium 1950/55.**)
Riv. Ortoflorofruttic. ital., 1956, **40**: 3-37, illus.

The Centre was founded on 1st July 1950. Information is given on (1) its objects, namely, the breeding and selection of fruits and vegetables; (2) its organization and layout, including lists of the varieties in the fruit tree collections; and (3) its scientific activities. The last include the breeding of 2 new peach and 2 new pear varieties and one new morello, breeding work on persimmon and quince, introductions, phenological and genetical research, and research on the manuring, pruning, propagation and protection of fruit trees.

2421. Balsgård (Granhall, I.).
Föreningen för Växtförädling av Fruktträd. Verksamhetsåret 1954. (**Annual Report of the Society for Fruit Tree Breeding, Balsgård, for 1954**), pp. 23.

The Station's activities again covered new crosses of top fruit varieties and the selection of seedlings from old crosses, laboratory studies on winter hardiness, cold storage of apples and pears, and the induction of mutations by radiation treatments. Breeding work with strawberries was begun.

2422. Hunter, A. W. S., and Walker, G. W. R.
Induced polyploidy in horticultural crops.
Progr. Rep. hort. Div., centr. exp. Fm, Ottawa, 1949–53, 1955, pp. 51-8, bibl. 5, illus.

Progress on the application of colchicine-induced polyploidy to the breeding and improvement of horticultural crops is reported. *Fruits:* Production of tetraploid apples, crosses with tetraploid apples, and tetraploids from seeds of open-pollinated triploid varieties; production of hexaploid cherry seedlings; and tetraploid saskatoons (*Amelanchier alnifolia*). *Vegetables:* tetraploid radish (var. Scarlet Globe) and tetraploid spinach (Long Standing Bloomsdale) appeared to have little advantage over diploid varieties. *Ornamentals:* the most successful crosses in tetraploid antirrhinum production were between red and ivory tetraploids, giving pink hybrids, but parents must also be selected on the bases of seed yield; a *Kalanchoë* variety Tom Thumb was treated with colchicine and has produced promising tetraploids for commerce; tetraploid lilies produced flowers not markedly larger in diameter than their diploid counterparts but individual flower parts showed a definite increase in size; tetraploid plants of *Salvia splendens* have been produced.

2423. Černenko, S. F., and Černenko, E. S.
Methods of producing hybrids between pear and apple. [Russian.]
Izv. Akad. Nauk S.S.S.R. Ser. biol., 1955, No. 4, pp. 14-32, bibl. 3, illus.

A detailed account of work at Mičurinsk. The most promising result so far appears to be a pear × apple hybrid on an apple rootstock, producing pear-like fruits weighing up to 80 g. with very good keeping quality but poor flavour.

2424. Souty, J.
Le catalogue des variétés fruitières. Choix des bonnes variétés. (**List of fruit varieties. Choice of good varieties.**)
Congr. pomol. int., Paris, 1955, 1956, pp. 89-94.

An official catalogue of apricot, peach and plum varieties grown in France was started in 1954, there being 2 lists for each species, viz. list A of varieties widely grown commercially and list B of other varieties. List A is here given for the 3 species.

2425. (Ljones, B.)
Melding om konserveringsforsøk med frukt 1951–53. (**Report on fruit processing trials 1951-53.**)
Reprinted from *Tidsskr. Hermetikind.*, 1955, No. 7, pp. 301-13.

The Committee for Studies on the Preservation of Vegetable Raw Materials in Norway carried out fruit processing trials in 1951–53. Data are presented on the canning qualities of plum, pear and apple varieties from different localities. *Plums.* Oullins gave a product superior to that of 3 other varieties. With Victoria degree of ripeness made little difference to quality, but small (18 g.) fruits proved inferior to medium (31 g.) and large (48 g.) fruits. *Pears.* The canned products of 4 varieties were of similar quality. *Apples.* All the 6 varieties tested, among them Bramley's Seedling, Gravenstein, Cox's Pomona and James Grieve, proved satisfactory if properly treated, with Bramley's Seedling ranking lowest. The finished product of varieties with red pigment in the skin tended to lose points on appearance if canned with the skin.

2426. Clarke, W. S., Jr., and Ritter, C. M.
Apple varieties in central Pennsylvania.
Bull. Pa agric. Exp. Stat. **605**, 1955, pp. 34.

The results of 47 years' observations of the fruiting and vegetative characteristics of 131 apple varieties, mostly grown on seedling rootstocks, are summarized. Production records are tabulated.

2427. Johansson, E.
Två nya äpplesorter. (**Two new apple varieties.**) [English summary 1½ p.]
Sver. pomol. Fören. Årsskr., 1955, 1956, **56**: 5-10, illus.

The variety Snövit, raised from crossing Stenbock with Pfirsichroter Sommerapfel, has proved very hardy in the north of Sweden, and is picked and eaten in September. Mio, which has resulted from a cross between Worcester Pearmain and Oranie, has an attractive appearance and excellent flavour, and is considered well worth planting in south and central Sweden.

2428. ANON.
Big apple with a big future.
Agric. Res. Wash., 1956, **4**(7): 3-5, illus.
A promising sport of Winesap was found, which was tetraploid in the deepest tissues. An adventitious bud has been induced to grow, and was found to be completely tetraploid.

2429. NILSSON, F., AND FERNQVIST, I.
Jättemutationer av äpple. (**Giant mutations of apple.**) [English summary ½ p.]
Sver. pomol. Fören. Årsskr. 1955, 1956, **56**: 77-86, bibl. 14, illus.
Two bud mutations, one of Wealthy and one of Charlamovsky, were found in a nursery. The Wealthy sport seems to have normal fertility, and the fruits are larger and flatter than those of its parent. The sport of Charlamovsky has lower pollen fertility but larger grains than its parent. The main characters of the few fruits produced in 1955 were similar to those of Charlamovsky.

2430. PLOCK, H.
Sortenbereinigung in einem Marillen -Anbaugebeit. (**Sorting out varieties in an apricot-growing area.**) [English, French and Spanish summaries, 5–7 lines each.]
Mitt. Klosterneuburg, Ser. B, 1956, **6**: 64-74, bibl. 1, illus.
In an attempt to reduce the number of apricot varieties grown in the Mainzer Becken area the author developed a method of identification based mainly on stone size and shape. Selection and clonal propagation are considered desirable.

2431. KROPP, K., AND ŁUCKA, M.
Śliwa "Żniwka". (**The "Żniwka" plum.**) [English and Russian summaries, 12 and 16 lines respectively.]
Prace Inst. Lab. bad. Przem. rol. spoż, 1955, **5**(4): 38-40, bibl. 9, illus.
This local Polish plum with golden-yellow, rather small fruits, which are generally freestone, has been the subject of analytical and processing tests over a 3-year period. It is exceptionally high in pectin and produces a very good jam with a flavour resembling that of apricots.

Propagation and rootstocks.

(*See also* 2457, 2503k, q, u, x, 2504d, l, x.)

2432. PASSECKER, F.
Keimungsphysiologische Untersuchungen an Kern- und Steinobst. (**Studies on the germination physiology of pome and stone fruits.**)
Gartenbauwiss., 1955, **2**: 274-90, bibl. 8, illus.
The studies were largely restricted to plum, cherry and apricot. [For work on pome fruits see *H.A.*, 23: 1528.] The following are the chief results from tests with embryos germinated in a Buchinger apparatus (a glass dish with a gridiron of glass rods on which the seeds rest in contact with water) and with whole seeds germinated in soil: (1) Embryos treated with a solution of Ceresan germinated well in the Buchinger apparatus if kept at room temperature. The method was suitable for use in germination tests and the indirect tetrazolium method has thus become redundant. (2) Darkness had a favourable effect on germination, but the season appeared to have no effect. (3) Stratification of seed at 2–5° C. for at least two months induced up to 40% germination within one year in the case of apricot and plum and up to 95% in the case of apple. (4) With plum seeds removal of the shell and treatment with Ceresan induced almost 100% germination within a year. (5) The presence of gaseous, germination-inhibiting substances in the seed is postulated to explain the similar effects of shell removal and stratification in accelerating germination.

2433. GRASSELLY, C.
La bouture de feuille. Nouvelle méthode de multiplication végétative d'un hybride pêcher × amandier utilisé comme porte-greffe. (**Leaf bud cuttings. A new method of vegetative propagation of a peach-almond hybrid used as a rootstock.**)
Rev. hort. suisse, 1956, **29**: 116-18, illus.
On a lignified current-year's shoot a dark green leaf with a dormant axillary bud is selected and cut with a tongue of wood. The cuttings are inserted in a peat/sand mixture in a heated frame with protection from the sun. Rooting becomes visible about 15–20 days after planting, and when the roots are a few centimetres long the cuttings are potted up. After hardening-off the cuttings are transplanted outside. The best rooting percentage was obtained with indole butyric acid treatment at 125 p.p.m. Cuttings taken in mid-June were planted out about a month later, and by November had produced plants 80–100 cm. high.—Stat. Rech. vitic. Arb. fruit., S.O., France.

2434. SHARPE, R. H.
Mist propagation studies with emphasis on mineral content of foliage.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 345-7, bibl. 3.
After varying periods under constant mist leaf levels of N, P and K in cuttings of several species were lower than at the start of propagation. Potassium loss was particularly marked in peach, and the level was critically low after 30 days under constant mist. Reduced levels of K were less serious in grape, blueberry, feijoa and cocculus cuttings. Ca and Mg levels in the foliage showed little change, and in some cases were increased.—Fla agric. Exp. Stat., Gainesville.

2435. ZATYKÓ, S.
A gyűrzűés módosított formája, mint vegetatív szaporítási módszer. (**A modified form of ringing for vegetative propagation.**)
Kertészet és Szőlészet, 1955, **5**: 23-5, from English abstr. in *Hungarian agric. Rev.*, 1955, **4**(3): 6.
During September soil was removed from stool-beds of various fruit species which had been gradually

mounded up during the summer; a ring of bark about 2 cm. wide was removed from the uncovered portion of the stems and the soil was replaced to prevent drying out. A callus developed over the rings and in some *Prunus* species rooting took place in the first year. The callused shoots were cut, stored in a pit and transplanted in the spring for rooting. Growth regulators applied to ringed Mahaleb shoots did not appear to affect rooting. Several shy-rooting Myrobalan strains were induced to root by underground ringing. When *Prunus avium* was ringed, some of the buds beneath the rings sprouted, and these shoots could also be induced to root by ringing and stooling.

2436. Kirchhoff, R.-H.
Zur Frage der autovegetativen Vermehrung von Edelsorten durch Steckholz-Vorspann. **(The problem of propagating cuttings of top fruit varieties on their own roots with the help of nurse roots.)**
Dtsch. Baumsch., 1956, **8**: 47-53, bibl. 2, illus.

The author describes a method of propagating top fruits from cuttings using rootstocks as a source of nutrition until rooting takes place. At the beginning of April cuttings about 30 cm. long were inarched into nurse rootstocks at 15 cm. above soil level, and their lower halves were buried in a soil-peat mixture. Union generally took place after 4–6 weeks; a high percentage of success was obtained with pome fruits and plums, but only about 50% of the cherry grafts united. One shoot of the cutting was allowed to develop, and the rest, with those of the rootstock, were pinched back during the summer. When a satisfactory root system had formed the cuttings were separated from the rootstock. Results of experiments with several apple, pear, plum and cherry varieties are summarized. The "nurse" rootstocks used were M.IV and IX, quince and pear, plum and cherry seedlings. After one growing season (April to October) the percentage of apples which had rooted was 29%, but marked varietal differences were observed; in plums 47%, and in cherries 21% of the cuttings had rooted. Pears did not generally form their own roots in the first season. After a second growing season rooting of apple and plum had increased to 81%, while rooting of pear and cherry was still unsatisfactory. The use of different rootstocks did not appear to affect rooting. [For earlier work see *H.A.*, 23: 1533.]—Inst. Obstbau, Berlin.

2437. Molčanov, I. I.
Raising fruit trees without transplanting. [Russian.]
Agrobiologija, 1955, No. 6, pp. 137-40, illus.

In a cold climate transplanting retards the growth of fruit trees. With apples one transplanting (rootstocks) was found better than two (rootstocks and grafted plants), but no transplanting was better still. The method consists of sowing wildling-rootstock seed *in situ* in groups, then grafting the 2 best plants in each group and finally retaining only 1.

2438. Scaramuzzi, F.
L'innesto "a doppio scudo". **(Double-shield budding.)** [English summary 14 lines.]
Riv. Ortoflorofruttic. ital., 1956, **40**: 55-65, bibl. 14, illus.

The double-shield budding technique is not suitable for use with the Kaiser pear, because the growth of the budded plant is greatly retarded as a result of the temporary direct contact between the bark of the Kaiser bud and that of the incompatible quince rootstock.

2439. Blair, D. S., Cannon, H. B., and Beingessner, H. F.
Pomology.
Progr. Rep. hort. Div., centr. exp. Fm, Ottawa, 1949–53, 1955, pp. 9-16.

Apple rootstocks: Some results from a rootstock trial at the end of the seventeenth year are presented. There was little difference in variability in tree size between trees on seedling roots and those on clonal Malling stocks, but yields from the trees on seedling stocks were more variable. The largest trees of McIntosh were on M.XII, and these also gave the highest yields. In general yielding ability was related to tree size or vigour. The yield per acre was in favour of dwarfing trees in the early years, but these showed a fairly high rate of mortality. *Hardy tree building:* The practice of double-working apples was found to reduce the cumulative yield over the 17-year period. Hibernal and Antonovka stem-builders tended to give large trees. Comparisons of tree size and yields have been made with other stem-builders. *Dwarf apple trees:* McIntosh and Lawfam trees on M.IX came into bearing before those on M.VII, but at 12 years from planting trees on M.VII outyielded those on M.IX. The use of M.IX and M.IV as interstocks resulted in higher and earlier yields than when they were used as rootstocks. [See also *H.A.*, 26: 164.]

2440. Beakbane, A. B., and Rogers, W. S.
The relative importance of stem and root in determining rootstock influence in apples.
J. hort. Sci., 1956, **31**: 99-110, bibl. 30, illus.

Lane's Prince Albert apple was grafted on M.IX, M.II, M.XII and seedling rootstocks by each of 3 different methods, viz. on the rootstock stem at approximately 2 in. and 7 in. above ground level (with a 3-in. portion below ground) and direct on a piece of root of the rootstock. Full records of vigour and cropping were maintained until the trees were 19 years old. The characteristic rootstock influence was found to be given by the roots themselves. The presence of a piece of rootstock stem tended to enhance the rootstock effect, but the stem effect was much smaller than that of the roots. Some possible mechanisms of these effects, and of the effects of intermediate stems, are discussed. At 7 years old the roots of certain trees were excavated, mapped, graded and weighed. No consistent differences were observed between excavated root systems of stem- and root-grafted trees. [From authors' summary.]—East Malling Res. Stat., Kent.

2441. Rubin, S. S.
The effect of the scion on the development of the root system of the rootstock. [Russian.]
Agrobiologija, 1955, No. 2, pp. 125-7, bibl. 2.

Three apple varieties grafted on wild apple rootstocks induced different types of root formation and distribution [see also *H.A.*, 25: 132]. The need to consider this in orchard cultivation and fertilizer practices is pointed out.

2442. Phillips, W. R., and Nelson, S. H.
Effect of rootstock and stempiece on the storage behavior of McIntosh apples.
Progr. Rep. hort. Div., centr. exp. Fm, Ottawa, 1949–53, 1955, pp. 125-6.

Single-worked trees on Anis rootstock produced fruit with the best storage properties. Fruit from trees on M.IX and M.XII was as resistant to core flush as that from trees on Anis, but was more susceptible to fungal waste. In double-worked trees there was an indication that the stem-builder had a much more pronounced effect on storage behaviour than the rootstock. Fruits from trees with an intermediate of Anis, Columbia or Osman were the most resistant to core flush and fungal wastage. *Malus baccata* intermediate on Anis rootstock had the highest core flush rating. The storage behaviour of apples from trees on Antonovka intermediate on Anis rootstock was better than that of fruit from trees on Antonovka roots. [See also *H.A.*, 24: 3529 and 26: 229.]

2443. Schmadlak, J.
Beobachtungen über das Verhalten von Birnensorten auf Quitte A mit und ohne Zwischenveredlung (Gellert) nach Vernichtung der Unterlage. **(Observations on the behaviour of pear varieties on Quince A with and without an intermediate stock (Gellert) after destruction of the rootstock.)**
Arch. Gartenb., 1955, **3**: 167-74, bibl. 3, illus.

The frost of the winter 1953/54 killed most Quince A rootstocks worked with pear in the nurseries of Eastern Germany. Trees with Gellert as an intermediate recovered owing to the formation of new roots by Gellert just under the surface of the soil. These observations are regarded as confirming Friedrich's findings on the effect of Quince A and pear interstocks upon the rate of transpiration in scion varieties.—Inst. Obstb. u. Obstzücht., Magdeburg-Ottersleben. [See *H.A.*, 24: 2251.]

2444. Plock, H.
Grundsätzliches über die Eignung bestimmter Marillenunterlagen. **(The principles underlying the use of certain apricot rootstocks.)** [English, French and Spanish summaries 4 lines each.]
Mitt. Klosterneuburg, Ser. B, 1956, **6**: 7-11, illus.

The merits of apricot seedlings, plums and bullaces as rootstocks for apricots are discussed, and they are all considered to be more suitable for the purpose than myrobalan stocks. It is recommended that the rootstock should also form the trunk of the tree.—Oppenheim/Rhein.

2445. Kasjjanenko, A. I.
On the causes of losses in cherry trees. [Russian.]
Agrobiologija, 1955, No. 6, 133-6, illus.

It has been suggested that in the steppe zone of the Ukraine young sweet cherry trees on mahaleb rootstocks die off more frequently than those on sweet or sour cherry rootstocks. Observations and root excavations, however, have shown that mahaleb is not an unsuitable rootstock, but that certain of its variants do not possess a vigorous enough root system for the steppe conditions. Thus 2 years after planting the roots of Mahaleb No. 17 penetrated to a depth of only 340 cm., those of No. 16 to 400 cm. and those of No. 18 to 520 cm.

2446. Herrero, J.
Incompatibilidad entre patrón e injerto. I. Comportamiento de algunas combinaciones recíprocas. II. Efecto de un intermediario en la incompatibilidad entre melocotonero y mirobolán. **(Stock-scion incompatibility. I. Performance of some reciprocal combinations. II. Effect of an interstock on peach-myrobalan incompatibility.)** [English summaries pp. 1¼ and ¼.]
An. Estac. exp. Aula Dei, 1955, **4**: 149-66, bibl. 20, illus., and 167-72, bibl. 6, illus.

Symptoms of incompatibility were studied in some reciprocal stock-scion combinations during their first 2 years of growth. Apricot-myrobalan, apple-quince and their reciprocal combinations showed incompatibility, the plants showing discontinuous phloem and xylem and tending to break off at the union in a high wind. Peach-myrobalan, peach-marianna and peach-apricot showed incompatibility symptoms of the tristeza type, namely, little or no late summer growth, unhealthy foliage and premature leaf fall, absence of starch in the stock in autumn, and premature degeneration of the phloem, especially in the stock. Myrobalan-peach, marianna-peach and apricot-peach proved compatible. Some combinations showing tristeza-like incompatibility were topworked with budwood of the rootstock clone when one year old. Following such treatment peach-myrobalan-peach and peach-marianna-peach showed incompatibility in the peach scion, absence of starch in the interstock and stock and early degeneration of phloem. Myrobalan-peach-myrobalan and marianna-peach-marianna were apparently compatible and starch was present in the stock.

In the second paper an account is given of the performance during the first year of growth of Early Hale peach on Myrobalan B with a Brompton interstock and of other combinations of these 3 varieties. The insertion of a Brompton interstock did not overcome the incompatibility between peach and myrobalan. Early Hale–Myrobalan B–Brompton also showed incompatibility, but Brompton–Myrobalan B and its reciprocal combination were compatible.

Growth and environment.

(*See also* 2391, 2399, 2400, 2503a, 2504w.)

2447. Bolas, B. D., and Ruck, H. C.
Experimental approach to the development of an adequate technique for water culture of apples.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 101-3, bibl. 10.

Investigations into methods of preventing the death of apple rootstocks grown in solution culture have shown that, in addition to adequate aeration, temperature is an important factor. To prevent infection of the roots by pathogens the temperature of the solution must be kept below 25° C. Under such conditions of culture the pH of the solution appears to be of minor importance. The antibiotics patulin and

sulphanilamide, added to the solution in an attempt to control *Pythium* sp., proved phytotoxic.

2448. Barlow, H. W. B., and Hancock, C. R.
Internode growth in stoolbed shoots of the apple rootstock Crab C.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 89-100, bibl. 16.

Experiments on vegetative shoots are described in which various parts were excised in order to assess their influence on elongation of the internodes. Removal of the tip (the terminal cluster of very small leaves enclosing the apical meristem) reduced the extension of the first internode below, without greatly affecting the second. Removing the leaves below the tip (1 and 2, or 1 to 4 inclusive) led to further restriction in the lengths of these two internodes, but the effect was not much increased by taking off additional leaves. The reduction in final internode length is the result of a lower growth rate after treatment rather than an earlier cessation of growth. The effect of the tip was analysed by removing the very small leaves therein, either as they attained a particular stage of development or in groups at one time. Removal, by either method, profoundly affected the final lengths of the internodes nearby, *increasing* the length of the internode just *below* the treated zone and *decreasing* the lengths of those *in*, and just *above* it. Development of the axillary buds was brought about by excising the small leaves, to an extent more or less proportional to the number of leaves removed. Certain defoliation treatments affected the size of the leaves below and/or above the treated zone. The results are discussed in terms of the supply of growth substances and food materials to the extending internodes. [Authors' summary.]

2449. Dragavcev, A. P.
Variations in the fruiting wood of the apple tree. [Russian.]
Agrobiologija, 1955, No. 5, pp. 148-9.

Studies on 4 apple varieties in the Tian-Shan mountains have shown that spurs on the upper half of any single year's growth are more long lived, vigorous and productive than those on the lower half. The leaves on these upper spurs also contain more chlorophyll.

2450. Tomanek, J.
Mikroklimatyczne róznice rozkladu temperatur powietrza w koronie drzewa. **(Air temperature differences in the crown of the apple tree.)** [English and Russian summaries ¾ p. each.]
Ann. Sect. dendrol. Soc. bot. Pologne, 1955, **10**: 261-74, bibl. 9.

The air temperatures in different parts of the crown of a standard apple tree growing at the Agricultural School, Warsaw, were measured in April/August 1939. The findings were: (1) The base of the crown showed the smallest range of mean monthly temperatures and was followed, in ascending order, by the centre, the north side, the top and the south side. (2) The temperature relationships of the various parts of the crown during the day and at night were different. (3) Differences from point to point were greater in fine than in cloudy weather and in summer than in winter. (4) The monthly variation ranged from 2·2° C. in April to 10·4° C. in August.

Soil management.

(*See also* 2349, 2503w, y, 2690, 2691.)

2451. Williams, H. R.
Grassing down of orchards.
Agriculture, Lond., 1956, **63**: 13-16.

A survey of orchard swards in the Eastern counties of England has shown that swards of perennial ryegrass and white clover, of white clover only or of the tumble-down types (natural swards) all have disadvantages. A timothy/white clover mixture was tried in several areas and produced some promising swards. The factors affecting establishment and management are discussed.

2452. Goode, J. E.
Soil moisture deficits developed under long and short grass.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 64-8, bibl. 5.

The soil moisture deficits developed under frequently mown and uncut swards of S.23 perennial ryegrass mixed with wild white clover have been measured and are discussed. Long grass fully exploited the moisture reserves to a soil depth of 3 ft. whilst short grass fully exploited the 0–18 in. depth, but only partially utilized the reserves in the 18–36 in. depth. It has been shown that close and frequent mowing may conserve from 1·0 to 1·5 in. of water [during the growing season]. Thus the recommendation to mow [orchard swards] frequently, in order to conserve water, is shown to be well founded. [Author's summary.]

2453. Goode, J. E.
Soil moisture deficits under swards of different grass species in an orchard.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 69-72, bibl. 2.

Under a uniform and frequent cutting treatment in an orchard S.23 perennial ryegrass, S.50 timothy and annual meadow grass were found to dry the soil to different depths. The depth of drying was greatest with S.23 and least with annual meadow grass, S.50 being intermediate. These differences were shown to be sufficient to account for a differential checking effect on young Laxton's Fortune [apple] trees on M.II in their first few years following grassing down, on the basis of competition for water. Differential competition for nitrogen, which may also have been involved in the checking effect, may have been, at least partially, an indirect result of the observed soil moisture differences. [Author's summary.]

2454. ten Cate, H. R.
Ervaringen met maaiwerktuigen in de fruitteelt. **(Experience with mowers in fruit growing.)** [English summary 6 lines.]
Meded. Dir. Tuinb., 1956, **19**: 209-12, illus.

Various types of orchard mower are described, including the cutter bar, the gang mower and the rotary cutter. The conditions for which each is most suited are indicated.

2455. Shibukawa, J.
Sod culture for increasing productivity of apples. [Japanese.*]
Aomori Apple Ass. Ser. **29**, 1955, pp. 36, illus.

* English translation by the author available in the Bureau.

Clean cultivation practices in hillside orchards in the Aomori prefecture of Japan have led to serious soil erosion and loss of tree vigour. Recommendations based on recent commercial experience are given for improving conditions by the use of sod culture. Complete sod cover may reduce yields as a result of competition for nutrients and moisture. In young apple orchards the sod-mulch system should be used, with strips of grass down the alleys and a mulch of rice litter or wheat straw 3–6 ft. wide beneath the trees. In mature orchards alternate row cultivation is recommended, the cultivated rows being mulched with straw in dry districts. On seriously eroded soils structure must be improved by the addition or organic matter before a sod can be established. The seeds mixture recommended for the sod-mulch system is 8 lb. red clover, 4 lb. white clover, 4 lb. ladino clover and 8–12 lb. orchard grass per acre. Frequent mowing is necessary to maintain soil moisture, and N fertilization must be increased by 50–100% compared with clean cultivation practices; urea sprays at the early pink bud stage are effective. Sod culture may increase damage by peach fruit moth, apple mealy bug and mice.

2456. Hobbis, E. W.
This mulch system defied the drought.
Grower, 1956, **45**: 1242-3, illus.

Bush cider trees were planted in 1951 and grassed down in the following spring. Rotted straw compost was applied each spring as a mulch with a complete fertilizer to each tree. The grass in the alleyways was cut and raked around the trees as additional mulch. During the drought period of 1955 the trees maintained healthy green foliage and vigorous growth.

Nutrition.

(*See also* 2389, 2417, 2503h, v, 2504t, u.)

2457. Prasad, A.
Effect of nutritional conditions on the growth and chemical composition of 'source' plants and on the rooting of stem cuttings derived therefrom. I. Effect on the growth of the 'source' plants.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 108-14, bibl. 7, illus.

A plum rootstock (Myrobalan B), apple rootstock (Crab C) and the golden willow were grown in sand culture in pots under a series of nutritional conditions for two seasons and used as sources for softwood and hardwood stem cuttings. The effect of these conditions on the growth and chemical composition of the source plants and on the rooting of the cuttings was examined, but only the growth responses are reported here. The growth of the three species varied directly with the level of N and K, and with pot size; there was no interaction. When the 3 species were grown side by side in sand with different combinations of high and low N and K and also in soil, the plum and willow grew best with high N plus high K and next best in soil, whereas the apple grew best in soil and very poorly under all other treatments. There was some indication that poor growth in one year was followed by earlier bud burst the next.

2458. Rootsi, N., and Fernqvist, I.
Gödslingens inverkan på askorbinsyrehalten hos Cox Orange. **(The effect of manuring on the ascorbic acid content of Cox's Orange.)** [German summary 1 p.]
Sver. pomol. Fören. Årsskr. 1955, 1956, **56**: 69-76, bibl. 5.

Fertilizer applications containing N, P and K in various combinations were given to Cox's Orange Pippin. In every case K reduced the ascorbic acid content of the fruits by 7·6 to 36·6%. Cold storage resulted in a further reduction in ascorbic acid content. The increase in fruit size after K manuring may partly account for the decrease in ascorbic acid percentage, because there was a definite negative correlation between fruit size and ascorbic acid content. In Ingrid Marie 50% of the total ascorbic acid content was found in the skin. Nitrogen also tended to reduce ascorbic acid content but to a lesser extent. Results with P varied. Total acids were reduced in storage. Nitrogen alone or with K increased the total acids, while P reduced total acids.

2459. Jazvickiĭ, M. N., and Kameneva, G. S.
Utilization of phosphorus fertilizers by fruit plants. [Russian.]
Sad i Ogorod, 1956, No. 4, pp. 44-7.

Soil applications of P^{32} labelled superphosphate were made by various methods to strawberry, black currant and apple, and the uptake and distribution of the element were studied. In strawberry leaves the highest P content resulted from band treatments. With black currants application to the root layer of the soil appeared best, and with apples applications in 25–45 cm. deep holes under the spread of the tree. In apple leaves only about 1·5% of the total P content was derived from treatments made 2½ months earlier.

2460. Upshall, W. H., Bradt, O. A., and van Haarlem, J. R.
Phosphate, potash, and farm manure for peach trees.
Bienn. Rep. hort. Exp. Stat. Prod. Lab. [Vineland] for 1953 and 1954, pp. 7-19, bibl. 18.

A peach orchard planted in 1940 on imperfectly drained, sandy loam was given yearly applications of P, K and farmyard manure, each alone and in all combinations. N was applied to the whole orchard each spring. In the period 1946–52 all treatments except P alone and K alone gave significant yield increases compared with the control plots. The PK combination was one of the most beneficial treatments. F.Y.M. alone gave a similar response but at a higher cost. Red colour of the fruits was increased most by the F.Y.M. treatments.

2461. Popenoe, J.
Some effects of potassium nutrition and fruit load on the peach as indicated by foliar analysis.
Diss. Abstr., 1956, **16**: 5-6, being *Publ.* 15302 of 54 pp.

Orchard trees of the peach varieties Elberta, Halehaven and Shippers Late were given treatments which included application of potassium chloride and removal of the crop near full bloom. Potassium application resulted

in increased leaf percentages of Ca and Mg. The K fertilizer had no consistent significant effect on N and P levels. Crop removal resulted in a reduction in the percentage of N, Ca and Mg, and an increase in the percentage of P and K in the leaves. Partial crop removal by thinning had a similar but rather small effect on these percentages. The effects of both crop load and K application were generally apparent by the end of June. Removal of the crop from single limbs resulted in a decrease in the Ca level in the leaves of treated limbs, but did not greatly affect the levels of other nutrient elements studied. It is suggested that the effects of crop load and K fertilization should be considered when leaf analysis data are used to estimate the nutritional status of peach trees.

2462. Liwerant, J.
Importance de l'application profonde de la fumure phospho-potassique dans les cultures fruitières: influence sur la croissance de jeunes pruniers d'Ente. **(The importance of deep application of phospho-potassic fertilizers in fruit growing: the effect on the growth of young d'Ente plum trees.)**
Ann. agron., 1955, **6**: 880-2.

The growth of young plum trees, in a soil of low K content, was markedly increased by applications of potassic fertilizer incorporated to a depth of 45 cm. In this soil N applications alone delayed vegetative development. Phosphatic fertilizers had no significant effect on growth.

Training and pruning.

(*See also* 2487, 2503p, 2504c, n, x, 3207.)

2463. Powell, H. R.
The pruning of fruit trees.
J. Agric. W. Aust., 1953, **2**: 187-93, 299-317 and 459-75, and 1955, **4**: 645-67, all illus.

The pruning of deciduous fruit trees is discussed in considerable detail with the aid of many photographs. The first article is devoted to general principles, the second to framework pruning, and the third, in two parts, to the pruning of peaches, nectarines and apples. Varietal differences in growth and fruiting habit, which necessitate modifications in pruning method, are fully described.

2464. Øydvin, M.
Høge eller låge frukttre. **(High or low fruit trees.)**
Norsk Hagetid., 1956, **72**: 2-4.

In an economic study carried out in apple orchards of the Ulvik area in south-western Norway, where Gravenstein is the leading variety, comparisons were made between the profits derived from trees 3, 4, 5, 6·5 and 8 m. high. The data presented for labour requirements for picking, yields per 100 sq. m., fruit quality, freedom from disease and returns per kg. of fruit show that it is desirable to limit tree height to 4 m.

2465. Parfenov, A. T.
A new method of pruning apple trees. [Russian.]
Sad i Ogorod, 1956, No. 2, pp. 41-3.

The system, developed in the Crimea for the control of biennial bearing, consists essentially in cutting back, at the start of the on years, all terminal and lateral fruiting wood except the spurs, thus reducing excessive fruiting and encouraging flower bud formation.

2466. Sergeev, L. I., and Kavraĭskiĭ, Ju. V.
When to prune frost damaged fruit trees. [Russian.]
Sad i Ogorod, 1956, No. 2, pp. 38-40, bibl. 1, illus.

A discussion on when to remove frost damaged branches is followed by experimental results obtained in the steppe region of the Crimea after the severe winter of 1953/54. The experiments were conducted on 4–5-year-old peaches on almond, and 20- to 21-year-old London Pippin apples on wild apple rootstocks. The removal of frost damaged branches or whole crowns from the peaches in April resulted in greatly reduced growth and no fruit during the following season. When, however, damaged peach and apple trees were carefully tended and the dead wood only was cut out in July, flower buds formed and good yields were obtained the following year.

2467. Renaud, M.
La taille longue "Renaud" des arbres fruitiers. **(The Renaud system of fruit-tree pruning.)**
Reprinted from *La Potasse*, 1956, No. 232, pp. 4, illus.

A pruning method has been developed for peach trees in North Africa, combining both winter pruning and summer disbudding and shoot-pinching. In the first year the framework is formed by selection of suitably placed shoots. Too many main branches and severe pruning should both be avoided. Fruiting may be regulated either by cutting back the fruiting wood in relation to general tree vigour or by thinning the fruits after June drop.

2468. Bradt, O. A.
Pruning methods for peach trees.
Bienn. Rep. hort. Exp. Stat. Prod. Lab. [*Vineland*] *for 1953 and 1954*, pp. 22-30, bibl. 3, illus.

Three pruning methods were compared on peach trees from the third to the fourteenth year in the orchard. On 3 varieties basic pruning (removal of dead and very weak wood and low drooping branches) was compared with heavy heading (basic pruning+heading back all branches to a lateral arising from 2-year wood), while on 3 other varieties lateral thinning (basic pruning+removal of half the laterals on 1-year wood) was compared with heavy heading. Both basic-pruning and lateral-thinned trees outyielded the heavy-headed trees. This heavier yield was obtained without adversely affecting the amount of large fruit. The total time required per lb. of fruit for pruning, thinning and picking was greater for the heavy heading than for the other 2 treatments. It is doubtful whether the extra pruning time required for lateral thinning, compared with basic pruning alone, is justified.

Pollination.

(*See also* 2417, 2663, 2664.)

2469. Kravčenko, L. M.
The effect of the pollinating variety on the development of fruit characters. [Russian.]
Agrobiologija, 1955, No. 2, pp. 115-17.

When flowers on different branches of a new apple hybrid were pollinated with pollen of 3 old varieties it was found that the pollinators affected fruit set, weight, shape, colour, chemical composition, maturity and storage quality.

2470. Maliga, P.
(Fertilization of the Jonathan apple.) [Russian and English summaries 1 p. each.]
Agrártud. Egy., 1953 (issued 1954), **17**(1, Part 1): 25-41, bibl. 10.

Pollen compatibility between Jonathan and important Hungarian varieties has been studied. Cross-pollination of Jonathan with Hungarian varieties gave a fruit set which varied between 11 and 35%. The number of viable seeds per fruit averaged 5·5–6·0, with 0·4 sterile seeds. The highest average number of seeds per fruit, namely 11·5 fertile and 0·4 sterile, was found in Jonathan fruits pollinated by Sikula.

2471. Johansen, C.
Bee-collected pollen for artificial pollination of apples.
Proc. Wash. St. hort. Ass., 1955, pp. 53-7, bibl. 26, illus.

To obtain satisfactory samples of bee-collected pollen there must be large plantings of a suitable apple variety without competing pollen plants. Hand-collected pollen was 71% viable after 9 months' storage at 0° F., whereas bee-collected pollen was only 46% viable. Normal insect pollination caused 50% more fruit set than hand pollination with hand-collected pollen. Fruit set from hand pollination with hand-collected pollen was 250% greater than hand pollination with bee-collected pollen.

2472. Hunter, A. W. S.
Pollination studies.
Progr. Rep. hort. Div., centr. exp. Fm, Ottawa, 1949–53, 1955, pp. 20-1, bibl. 3.

The pollination requirements of the pear varieties Enie, Menie, Miney, Moe and Phileson have been studied. Enie, Menie and Phileson were each satisfactorily pollinated by any one of the other 4 varieties. Miney gave a satisfactory crop when pollinated by Enie, Moe and Phileson, while Moe was pollinated satisfactorily only by Menie and Phileson. Phileson, and to a lesser extent Enie, Menie and Miney were self-fertile, while Moe was self-sterile. All varieties were regularly capable of producing an appreciable quantity of mature fruits from emasculated but unpollinated flowers; these fruits were seedless. Seedless fruits were also produced by self-pollinations, by Menie pollinated by Miney, and by Phileson pollinated by Enie, Menie and Miney.

2473. Singh, U. P.
A study of varietal incompatibility in loquat (*Eriobotrya japonica* Lindl.).
Indian J. Hort., 1955, **12**: 115-16, bibl. 5.

Reciprocal pollination studies were made on 4 commercial varieties: Tanaka, California Advance, Pale Yellow and Golden Yellow. Golden Yellow was totally self-incompatible and the other varieties were partially so. California Advance was the best pollinator for the other 3 varieties, giving 41·7–75·0% fruit set, and was itself pollinated equally well by any of the others (52·5–55·3% fruit set).

Blossom and fruit thinning.

(*See also* 2417, 2487, 2504i.)

2474. Teubner, F. G., and Murneek, A. E.
Embryo abortion as mechanism of "hormone" thinning of fruit.
Res. Bull. Mo. agric. Exp. Stat. **590**, 1955, pp. 88, bibl. 217, illus.

A study was made of the various developmental factors related to hormone thinning of fruit. In the later stages of apple embryo development, it was found that abortion or inhibition of the embryo could be secured without an accompanying abscission of the fruit. Synthetic growth regulators applied during early fruit development in apples could, among other effects, delay the abscission of the second drop, which is otherwise unaffected by the treatment. One of the first effects of the thinning spray is retarded fruit development. The retarded fruits eventually abscis as 3rd and 4th drops with most of the thinning effect coming from the increase in the 3rd drop. Embryo abortion is induced in all seeds of the retarded potential 3rd and 4th drops, and this inhibition of embryo development occurs at several distinct stages of embryo development. Embryo abortion at the 60-celled stage was not usually accompanied by fruit abscission. Potential drops which are retarded in development have a considerably higher ethylene production than normal. In a study of the indole-acetic acid oxidase system of apple embryos, it was found that the activity of the enzyme was greatest in rapidly developing embryos. Indole-acetic acid was oxidized at a much greater rate than were indolepropionic or indolebutyric acids.

2475. Kasahara, J., and Oguro, E.
Studies on fruit (blossom) thinning of apples by hormone sprays. I. Thinning effects on several commercial varieties. [Japanese, with English summary ¼ p.]
J. hort. Ass. Japan, 1956, **24**: 233-9, bibl. 23.

NAA was sprayed on 4 varieties 1 week and again 2 weeks after full bloom. On American Summer Pearmain and Jonathan thinning was generally best with 10 p.p.m. and on Rall's Janet and Indo with 20 p.p.m., but results appeared to be correlated with tree vigour. Leaf injury was slight at 10 and 20 p.p.m. and severe at 40 and 80 p.p.m. NAA had no effect on biennial bearing.

2476. Øhlers, H.
Forsøg med frugtudtynding på aeble ved sprøjtning med plantehormoner. **(Experiments on the thinning of apple fruits by hormone sprays.)**
Tidsskr. Planteavl, 1955, **59**: 636-69, illus.

In trials carried out during the seasons 1950–54 three proprietary chemicals containing naphthaleneacetic acid were tested on a number of well known apple varieties for fruit thinning. The fully tabulated data show that: (1) Treatment at the concentrations recommended by the manufacturers increased fruit size by an average of 17%; (2) spraying at the end of the blossoming period gave better results than earlier or later applications; (3) mixing the NAA preparations with lime-sulphur or wettable sulphur had an adverse affect on their action, whereas captan had little effect on

their efficiency; (4) low-volume spraying yielded results as good as those obtained with conventional concentrations, provided the total amount of active substance applied was roughly similar in both cases (about 30–54 g./ha.); (5) in one trial with Belle de Boskoop the mean yield of the controls in the off-year was increased from 15·7 kg. per tree to 40·5 and 64·6 kg. respectively as a result of applications at 15 and 22·5 p.p.m. in the preceding on-year.

2477. Blair, D. S., and Nelson, S. H.
Use of chemicals in apple production.
Progr. Rep. hort. Div., centr. exp. Fm, Ottawa, 1949–53, 1955, pp. 39-49, bibl. 5.

Thinning experiments with dinitro compounds showed that effective thinning depended on accurate timing; leaf injury could be caused by cool, wet weather after spraying. Early sprays of NAA, applied at the calyx stage, gave larger fruits and more uniform cropping than later sprays, but on McIntosh and Duchess calyx sprays may cause leaf dwarfing, and with these varieties treatment should be deferred for a week. Naphthaleneacetamide was quite as effective for thinning apples as sodium NAA, and caused less leaf injury. Commercial preparations of MCPA delayed fruit abscission on McIntosh. The use of 2,4,5-T and 2,4,5-TP as pre-harvest drop sprays is also reported on [see also *H.A.*, 23: 2640].

2478. Edgerton, L. J.
New thinning sprays for peaches.
Amer. Fruit Gr, 1956, **76**(3): 48-9, illus.

Sprays of 3-chloro-IPC 3–4 weeks after flowering have reduced fruit set of peaches, although results have been variable. Foliage and shoot growth following IPC application have generally been good. Naphthyl phthalamic acid (NPA) has given satisfactory thinning of Elberta at rates of 100–150 p.p.m., and of Halehaven and Redhaven at 250–300 p.p.m. The best time for NPA application is 2–5 days before full bloom. Sprays applied up to a month after full bloom also reduced fruit set, but these later applications resulted in leaf injury and stunted growth.—Cornell Univ.

2479. Bradt, O. A.
Hose *vs.* hand thinning of peaches.
Bienn. Rep. hort. Exp. Stat. Prod. Lab. [*Vineland*] *for 1953 and 1954*, pp. 31-3, bibl. 3.

Fruit thinning by means of a hose 15 in. long on the end of a stick was compared with hand thinning for 5 consecutive years on the peach varieties Kalhaven and Redhaven. Hose thinning was 2–3 times quicker than hand thinning and did not adversely affect tree growth or fruit yield and quality.

Fruit drop and size.

(*See also* 2474, 2477, 2504s.)

2480. Rakitin, Ju. V.
Reduction of pre-harvest fruit drop in apple and pears. [Russian.]
Izd. Akad. Nauk S.S.S.R., 1952, pp. 19.

Applications of α-NAA and its sodium salt were found to be about equally effective for controlling pre-harvest drop in apples and pears. The activity of the materials became apparent 3 days after treatment, reached a maximum in 5–7 days and terminated after 10–20 days depending on variety. Sprays at 0·001% from the ground and at 0·005% from aircraft, and dusts and aerosols both at 0·1% were equally effective.

2481. Marth, P. C., Preston, W. H., Jr., and Mitchell, J. W.
Relative effectiveness of the mono-, di-, and trichlorophenoxyacetic acids in retarding abscission of mature apples.
Bot. Gaz., 1955, **117**: 51-5, bibl. 8.

Sixteen phenoxy compounds were applied at concentrations of 1% to 6 apple varieties about 3 weeks before their usual harvest date. 3,4,5-Tri-chlorophenoxyacetic acid was highly effective in retarding abscission in all 6 varieties, while 4-chloro- and 2,5-dichlorophenoxyacetic acids were highly effective on 5 varieties. Four acids, 3-chloro, 3,4-dichloro-, 2,3,4-trichloro-, and 2,4,5-trichloro-, were highly effective on 4 of the 6 varieties. Abscission of York Imperial and Winesap was effectively retarded by 2,4-D, but only Winesap responded well to 2-chlorophenoxyacetic acid.—Agric. Res. Serv., U.S. Dep. Agric., Beltsville, Md.

2482. Crane, J. C.
Growth regulators on apricots.
Calif. Agric., 1956, **10**(4): 7, 15-16, illus.

A single spray of 2,4,5-T applied to apricot trees at the start of pit hardening increased fruit size by as much as 47%, hastened maturity, effectively controlled pre-harvest drop and, under certain conditions, gave a red blush to the fruit [see also *H.A.*, 26: 203]. Increases in fruit size, hastening of maturity and control of pre-harvest drop were also caused by 2,4,5-TP and 2,4-D, but the former significantly increased fruit cracking and 2,4-D killed the shoot tips [see also *H.A.*, 25: 162].

2483. Harris, R. W., and Hansen, C. J.
Prune size affected by 2,4,5-T.
Calif. Agric., 1956, **10**(4): 6, 15, illus.

In small-scale trials at Davis, Calif., French prune trees were sprayed on 1 of 3 dates during May with 2 concentrations of 2,4,5-T. All sprays increased fruit size. The earlier sprays and higher concentration caused more fruit injury and drop than did the latest spray and lower concentration. In more extensive orchard trials fruit size was less affected by 2,4,5-T and few fruits or shoots were injured. Sprays applied 2–4 weeks before pit hardening, however, seriously injured fruit and shoots in 2 orchards.

Fruit composition.

(*See also* 2458, 2503t.)

2484. Luckwill, L. C., and Powell, L. E., Jr.
Absence of indoleacetic acid in apple.
Science, 1956, **123**: 225-6, bibl. 8.

An auxin has been found in fresh and dried apple seeds, pollen, fruit and leaves which has an R_f value close to that of IAA. It did not give the characteristic colour reactions of IAA with Salkowski and Ehrlich reagents. A critical investigation has led to the conclusion that this auxin is not IAA, and no evidence was obtained of the presence of IAA in apple tissue.—N.Y. Stat. Coll. of Agric., Cornell Univ., Ithaca.

2485. Wohlmuth, N.
Fruktose, Glukose und Saccharose in reifen Früchten. **(Fructose, glucose and saccharose in ripe fruits.)** [English, French and Spanish summaries ¼ p. each.]
Mitt. Klosterneuburg, Ser. B, 1956, **6**: 49-55, bibl. 8.

The sugar content was determined in the fruits of 12 pear varieties. Pears had higher fructose contents than other fruits. Fructose formed 80–90% of the total sugars in summer pears, and 70–80% in winter pears. In later-ripening varieties the glucose and saccharose contents were higher than in early varieties. In apple varieties fructose and glucose+saccharose were present in approximately equal proportions.

2486. Truscott, J. H. L., and Wickson, M.
Fruit maturity as indicated by juice viscosity.
Bienn. Rep. hort. Exp. Stat. Prod. Lab. [*Vineland*] *for 1953 and 1954*, pp. 105-7, bibl. 1.

In an earlier report [*H.A.*, 23: 3869] it was suggested that changes in the viscosity of fruit juice might be used as an indication of proper picking maturity. The fruit tissues were heated before the juice was expressed and it was later found that duration of the heating period had a large effect in developing the latent viscosity of the pressed juice. This report illustrates the effects of different periods of heating on the juice expressed from tissues of Bartlett pear, Veteran and Jubilee peaches and Duchess apples.

Harvesting and packing.

(*See also* 2486, 2503m, 2504e, f, h, o, v.)

2487. Forney, F.
The Trump Giraffe.
Proc. Wash. St. hort. Ass. 1955, pp. 178-9.

The Trump Giraffe is a pair of hydraulically-operated booms on a revolving platform, which is drawn by a tractor. When used for apple harvesting, picking time and the amount of bruising were reduced. The machine has also been used for pruning and thinning.

2488. Glas, A.
2 hulpmiddelen bij de pluk. **(Two aids at harvest time.)**
Fruitteelt, 1956, **46**: 256, illus.

In a close-growing orchard a tractor-drawn sleigh for carrying boxes was more manoeuverable than a trailer. A light framework was used to form a picking table for orchard boxes.

2489. Bloomfield, J. S.
A lug box for picking and storing fruit.
J. Agric. W. Aust., 1956, **5**: 43-5, illus.

The construction of a picking box made of pine wood is described. The boxes lend themselves to the use of pallets and are ideal for stacking in a cool store.

2490. Crandall, P. C.
A new picking container for peaches.
Proc. Wash. St. hort. Ass. 1955, pp. 114-18, illus.

A fibre-board container which forms a lining for an orchard box is described. It is claimed that bruising is much reduced by its use.

2491. Mercier, R. G.
Factors affecting brown rot development in peaches in the container. I.
Bienn. Rep. hort. Exp. Stat. Prod. Lab. [*Vineland*] *for 1953 and 1954*, pp. 39-50, bibl. 2, illus.

Peaches packed in tubes (5 per tube and 10 tubes in a cardboard shipper) were shipped from Vineland to Montreal and back and then examined. Ventilation of the tubes by four ¼-in. holes each did not significantly reduce brown rot wastage, bruising or ripening rate. Placing packed peaches in store overnight before shipping did not increase loss from rotting. The use of cellophane covers on 6-quart baskets significantly increased rot wastage. The effect of covering was reduced by precooling. The middle layer of a 6-quart basket developed more brown rot than either the top or bottom layers. Similar orchard spray programmes with wettable sulphur or captan gave similar brown rot control.

Storage.

(*See also* 2407, 2442, 2504b, r, v.)

2492. Ministry of Agriculture, London, and D.S.I.R.
Refrigerated stores for fruit.
Bull. Minist. Agric. Lond. and D.S.I.R. **159**, 1955, pp. 26, bibl. 5, illus., 2s.

The basic principles of the design, construction and operation of refrigerated stores and refrigerated gas stores are outlined for the benefit of those who wish to build new stores or to convert existing buildings. There is a short section on alternative and seasonal uses of cold stores.

2493. van Hiele, T., and others.
Hoelhuisbouw. Hoe kunnen de kosten worden verlaagd? I–IV. **(Building a cold store. How can the costs be reduced. I-IV.)** [English summaries ¾ p.]
Meded. Dir. Tuinb., 1956, **19**: 30-40, 76-91, 105, bibl. 1, illus.

A detailed study was made of the investment costs involved in building a cold store for fruit and vegetables at the Nijmegen Auction Centre. Possible methods of reducing the costs per kilogram of stored products were investigated, namely (a) by reducing costs associated with the construction and insulation of the building and the layout of plant and equipment, and (b) by ensuring maximum efficiency in utilizing the space in the building. This article deals with the subject under the following headings: I. Spreading the marketing season by cold storage. II. Possibilities of reducing investment costs. III. Construction of the cold store at Nijmegen Auction Centre. IV. Technical economic aspects of cooling installations for fruit cold stores.

2494. Pflug, I. J., Dewey, D. H., and Angelini, P.
The design and construction of a pilot-sized hermetic controlled atmosphere cold storage chamber.
Quart. Bull. Mich. agric. Exp. Stat., 1956, **38**: 401-8, bibl. 3, illus.

The hermetically sealed fruit storage chamber described has a 38-bushel capacity and was designed and built

for controlled atmosphere studies. Accurate control of the gas levels was facilitated by the elimination of air leakage and its many associated problems.

2495. Anon.
Humidity system cuts weight losses by stored apples.
Grower, 1956, **45**: 392.

High humidity was maintained in gas and cold stores on a fruit farm in Essex by spraying warm water (±60° F.) at 1 gal. per minute into the fan duct. The store temperature was maintained at 38° F. The estimated loss in weight per bushel before using the humidity system was 6 lb., while losses after installation varied from ½ to 2¾ lb. per bushel.

2496. Loewel, E. L., and Blank, H. G.
Der Satomair-Luftbefeuchter, ein brauchbarer Helfer bei der Obstlagerung. (**The Satomair air humidifier for use in apple storage.**)
Mitt. ObstbVersuchsringes, Jork, 1956, **11**: 86-8, illus.

A humidifier of Dutch origin is described which was able to maintain the desired humidity (90–95%) in a store containing 4 apple varieties.

2497. Phillips, W. R.
Low temperature research.
Progr. Rep. hort. Div., centr. exp. Fm, Ottawa, 1949–53, 1955, pp. 120-2.

Effect of storage temperatures. In bulk storage experiments the life of McIntosh was considerably prolonged by reducing temperatures to 32° F., but this variety could not be stored beyond 7 months at 30–33° F. Mealiness was related to storage temperature and developed at 33° F. but not below. Reducing sugars increased for the first 3 months at 31°, 32° and 33° F. Titratable acidity decreased uniformly throughout storage, but the rate was unaffected by temperature. *Effect of storage on bruised McIntosh apples.* Pressure and impact bruises were given to McIntosh apples. Size, temperature and source of fruit had little influence on bruising damage, but softness of fruit influenced degree of bruising. Later-harvested apples were more susceptible to impact bruising than earlier-harvested apples. Bruising, particularly the impact type, was responsible for the onset of senile breakdown.

2498. Martin, D., and Cerny, J.
Low oxygen gas storage trials of apples in Tasmania.
Tech. Pap. Div. Plant Ind., C.S.I.R.O. Melbourne **6**, 1956, pp. 19, bibl. 17, illus.

In gas stores, low O_2 concentrations without CO_2 have been used with low storage temperatures without increasing the susceptibility of fruit to low-temperature breakdown. The method has also given good control of softening, has improved texture and reduced wastage from disorders and rots, and has markedly reduced the proportion of soluble pectin in the fruits. Oxygen concentrations of about 3% have given the most promising results. The method was suitable for several apple varieties and for Packham's Triumph pear. Storage of apple varieties susceptible to scald and breakdown was better at low O_2 concentrations than at 5% CO_2 and 16% O_2, but the 2 storage methods gave similar results with varieties resistant to scald and breakdown. Control of Jonathan spot and pit was less good in low O_2 than in CO_2 gas storage, but was better than in air storage.

2499. Fidler, J. C.
The effect of ethylene on the rate of respiration of apples, as a function of temperature.
Proc. 8th int. Congr. Bot. Paris, 1954, p. 392, reprinted as *D.S.I.R. Food Invest. Mem.* **973**, 1954, pp. 4, bibl. 17.

The author discusses research on the concept that the climacteric is connected with the production of ethylene. In 2 seasons' experiments with pre-climacteric apples of King Edward VII it was found that neither ethylene nor the vapour given off by ripe apples had any effect on respiratory activity at 3° C. At 7° C. the effect was slight, and at 12·5° C. it was marked.—Ditton Lab., D.S.I.R.

2500. Kott, V.
Vliv kysličníku uhličitého na uchovatelnost a chemické složení třešní, višní, meruněk a hrušek. (**The effect of carbon dioxide on the keeping quality and chemical composition of sweet and sour cherries, apricots and pears.**) [Russian summary ¼ p.]
Sborn. čsl. Akad. zeměd. Věd. Rostl. Výroba, 1955, **28**: 727-48, bibl. 24.

The storage life of sweet and sour cherries in a gas store was 271% longer than in a common store, that of apricots 117% and that of the pear variety Solanka 155% longer. Weight losses in the gas-stored fruit were lower than in the air-stored fruit, and some changes were noted in the chemical composition of the gas-stored fruit, the l-ascorbic acid content in particular being reduced. It is recommended to store sweet cherries in an atmosphere containing 10 to 20% CO_2, sour cherries in 20 to 30% CO_2, apricots in 5% and the pear Solanka in 10 to 20% CO_2, all at 1 to 5° C.

2501. de Haan, I.
Preliminary observations in connection with the generation of heat by apricots during storage.
Dec. Fruit Gr, 1955, **5**: 265, 270-2.

The respiration of Royal apricots at 2 stages of maturity was studied at 31°, 45° and 80° F. Respiration increased rapidly with a rise in temperature. The amount of heat generated by the respiration processes under poorly ventilated conditions was sufficient to cause a temperature increase in the fruit to beyond the fatal temperature of 122° F.

2502. Woodbridge, C. G., and Crandall, P. C.
Some factors affecting cherry stem shrivel.
Proc. Wash. St. hort. Ass. 1955, pp. 106-8.

Sprays of wettable or emulsifiable parathion had no effect on the amount of stem shrivelling. By cooling the fruit immediately after picking and storing it at high humidity, shrivelling was reduced to a minimum.

Noted.

2503.
a Bottini, E.
La maturazione della frutta ed i suoi catalizzatori. (**Fruit maturation and methods of advancing it.**)
Riv. Fruttic., 1956, **18**: 123-32, bibl. in text, illus.
A review.

b CAILLAVET, H.
Fiche descriptive de la variété de pêche "Southland". **(Descriptive note on the peach variety Southland.)**
Arboric. fruit., 1956, No. 25, pp. 7-9, illus.

c CAILLAVET, H.
Fiche descriptive de la variété "Dixired". **(Descriptive note on the [peach] variety "Dixired".)**
Arboric. fruit., 1956, No. 26, pp. 3, 5, illus.

d CALIFORNIA FIG INSTITUTE, DRIED FIG ADVISORY BOARD, AND DRIED FIG ADMINISTRATIVE COMMITTEE.
Statistical Review of the California Fig Industry, September 15, 1955, Mimeo pp. 22.

e CARTER, G. H., AND OTHERS.
Fresh-fruit and canning qualities of some sweet cherry varieties.
Proc. Wash. St. hort. Ass. 1955, pp. 102-5.

f COMBRET, R.
Aperçu de la culture fruitière au Mexique. **(A survey of fruit growing in Mexico.)**
Rev. d'Oka, 1956, **30**: 5-8.
Temperate and tropical.

g COUTANCEAU, M.
Impressions sur le comportement des variétés de pommiers d'origines étrangères introduites en culture en France depuis 1930. **(Impressions of the behaviour of foreign apple varieties introduced into France since 1930.)**
Congr. pomol. int., Paris, 1955, 1956, pp. 49-65.
The best are Golden Delicious and Red Delicious.

h EMMERT, F. H.
Foliar analysis results from 40 Connecticut apple orchards.
Bull. Storrs agric. Exp. Stat. **317**, 1955, pp. 18, bibl. 63.
Compared with results of other foliar analysis surveys.

i DELL'EVA, E.
La coltura del pero vista attraverso la statistica. **(Pear growing statistics.)**
Ital. agric., 1956, **93**: 167-73, illus.
Italian pear production, hectare yields, exports and areas.

j FARMER, A.
The nectarine, its history, culture and propagation.
N.Z. Gdnr, 1956, **12**: 440-3, 465, illus.
Culture of nectarine trees. Methods which ensure satisfactory crops.
N.Z. Gdnr, 1956, **12**: 503-7, 525, bibl. 2, illus.
Including spray programme.

k FARMER, A.
Methods of handling peach stones for production of seedling stocks.
Orchard. N.Z., 1956, **29**(3): 16-17.

l FOGLE, H. W., AND OTHERS.
A comparison of several Italian-type plum varieties.
Proc. Wash. St. hort. Ass. 1955, pp. 109-13, bibl. 3.

m FRENCH, B. C., SAMMET, L. L., AND BRESSLER, R. G.
Pear packing plant economies.
Calif. Agric., 1956, **10**(1): 2, 10.
Suggestions based on studies of methods used in California.

n GERRITSEN, J. D., AND VAN SOEST, W.
De teelt van fruit and industrietomaten in Noord-Italië. **(The culture of fruit and processing-tomatoes in Northern Italy.)** [English summary 1 p.]
Meded. Dir. Tuinb., 1956, **19**: 63-75, 163-9, illus.

o HAMID, A., AND ALI, N.
Survey of Murree Hills for the development of apple industry.
Punjab Fruit J., 1955, **19**: 9-25.
Over 9,000 acres available in the Punjab.

p HILKENBÄUMER, F.
Schnitt von jungen Baumkronen und Sträuchern. **(Pruning young trees and bushes.)**
Merkbl. Landesaussch. für landwirtsch. Forsch., Erzieh. u. Wirtsch. Beratung **71**, 1955, pp. 8, illus.
Diagrams of pruning for apple, pear, morello cherry, red currant and gooseberry.

q JOHANSSON, E.
Grundstammar till fruktträd. **(Rootstocks for fruit trees.)**
Sver. pomol. Fören. Årsskr. 1955, 1956, **56**: 113-25, bibl. 9, illus.
Trials of apple, pear, plum, apricot, peach and cherry rootstocks in Sweden.

r KLINGBEIL, G. C.
Fruit varieties for Wisconsin.
Circ. Univ. Wis. Ext. Serv. **501**, 1955, pp. 8, illus.
Apples, pears, grapes, plums, cherries, strawberries, raspberries, currants and gooseberries.

s KOLESNIKOVA, A. F.
Northern apricots. [Russian.]
Priroda, 1955, **44**(10): 94-6, bibl. 1, illus.
New hardy varieties.

t LI, K. C., AND WAGENKNECHT, A. C.
The anthocyanin pigments of sour cherries.
J. Amer. chem. Soc., 1956, **78**: 979-80, bibl. 16.
Antirrhinin and mecocyanin.

u LIEBSTER, G.
Versuche zur wurzelechten Vermehrung von Obstgehölzen mit "Airwrap". **(Experiments on the propagation of fruit trees on their own roots with the aid of Airwrap.)**
Gartenbauwiss., 1955, **2**: 261-8, bibl. 11, illus.
Unsatisfactory results from air layering experiments on apple and pear.

v McCLUNG, A. C., AND LOTT, W. L.
A survey of the nutrient composition of leaf samples from North Carolina peach orchards.
Proc. Soil Sci. Soc. Amer., 1956, **20**: 10-15, bibl. 20.

w MAGNESS, J. R.
Irrigation of orchards in Eastern United States.
Proc. 100th annu. Mtg N.Y. St. hort. Soc., 1955, pp. 197-203.
A discussion of practices and effects.

x MARGOLIN, A. F.
The culture of dwarf apples. [Russian.]
Priroda, 1956, **45**(3): 98-100, illus.
Dwarfing apple rootstocks in the USSR [see also *H.A.*, 25: 3536].

y MAURI, N.
Sous-solages arboricoles sans matériel lourd. (**Subsoiling orchards without heavy equipment.**)
Fruits et Prim., 1955, **25**: 526-9, diagrams.
By explosives.

z MICKLEM, T., AND KRIEL, P. E.
The deciduous fruit industry in the Cape Province.
Bull. Dep. Agric. S. Afr. **338**, 1955, pp. 37, bibl. 1.
Numbers and varieties of non-bearing and bearing fruit trees and table-grapevines.

2504.

a MINISTRY OF AGRICULTURE, LONDON.
Apples and pears.
Bull. Minist. Agric. Lond. **133**, 2nd edition reprinted, slightly amended 1954, pp. 124, bibl., illus., 4s. 6d.
See *H.A.*, 16: 1783 and 21: 234j.

b MINISTRY OF AGRICULTURE, LONDON.
Home storage of apples and pears.
Adv. Leafl. Minist. Agric. Lond. **181**, amended 1955, pp. 4.

c MINISTRY OF AGRICULTURE, LONDON.
Pruning plums and cherries.
Adv. Leafl. Minist. Agric. Lond. **124**, amended 1955, pp. 4.

d MINISTRY OF AGRICULTURE, LONDON.
Rootstocks for apples and pears.
Adv. Leafl. Minist. Agric. Lond. **335**, amended 1955, pp. 4.

e MOTTS, G. N.
Marketing apples prepacked at the shipping point.
Ext. Bull. Mich. St. Coll. **329**, 1954, pp. 19.

f MOTTS, G. N.
Peach grader's manual.
Pear graders' manual.
Ext. Folders Mich. St. Coll. **F.201** and **F.202**, 1955, 1 folded sheet each.

g OLDÉN, E. J.
Hybridiseringsförsök inom plommongruppen. (**Hybridization studies between plum species.**) [English summary 2 pp.]
Sver. pomol. Fören. Årsskr. 1955, 1956, **56**: 155-74, bibl. 35, illus.
Preliminary results; the new hybrids have not yet fruited.

h PLOCK, H.
Kleinsortiermaschinen für Marillen und Paradeis. (**Grading machine for apricots and tomatoes.**) [English, French and Spanish summaries 2 lines each.]
Mitt. Klosterneuburg, Ser. B, 1956, **6**: 23-4, illus.
A size-grading machine with a capacity of 1,000 kg./hr. is described.

i PRESTON, A. P.
Thinning apples by the leaf-count method.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 157-8.
For a more detailed account see *H.A.*, 25: 158.

j ROACH, F. A.
Apples in Denmark and Sweden.
Agriculture, Lond., 1956, **63**: 23-6, illus.
Trends in orchard management, marketing methods and research.

k ROBIN, F.
La production et le marché des fruits et légumes. (**Fruit and vegetable production and trade.**)
C.R. Acad. Agric. Fr., 1956, **42**: 129-36, bibl. 1.
In France.

l SAPOŽKOV, I. A.
Changes induced in established varieties of fruit trees. [Russian.]
Priroda, 1955, **44**(11): 97-8, illus.
See *H.A.*, 24: 1176.

m SCHMID, G.
Die Züchtung neuer Apfelsorten an der Eidg. Versuchsanstalt für Obst-, Wein- und Gartenbau Wädenswil. (**Breeding new apple varieties at the Wädenswil Horticultural and Viticultural Research Station.**)
Schweiz. Z. Obst- u. Weinbau, 1956, **65**: 212-14.

n SNYDER, J. C.
Training young Golden Delicious.
Bett. Fruit, 1956, **50**(9): 13-14, illus.

o STENDER, J. A.
De aanschaffing van een fruitsorteermachine. (**Purchasing a fruit grader.**) [English summary 8 lines.]
Meded. Dir. Tuinb., 1956, **19**: 214-16.
See *H.A.*, 26: 226.

p TEUBNER, F. G.
Frozen sections of embryos in apple ovules.
Stain Technol., 1956, **31**: 95-6, illus.

q TRIOREAU, P.
Le comportement des variétés nouvelles de pommes récemment importées des U.S.A. (**The behaviour of new apple varieties recently introduced from the U.S.A.**)
Congr. pomol. int., Paris, 1955, 1956, pp. 71-82.
In France and North Africa.

r ULRICH, R.
Données et perspectives nouvelles dans le domaine de la conservation des fruits à l'état frais. **(Information on and new perspectives in storing fresh fruit.)**
Congr. pomol. int., Paris, 1955, 1956, pp. 107-20, bibl. 55, illus.
A review of recent work on storage of fruit by cold, gas or radiation methods.

s UPSHALL, W. H.
The preharvest drop of peaches.
Bienn. Rep. hort. Exp. Stat. Prod. Lab. [Vineland] for 1953 and 1954, pp. 33-9, bibl. 3.
See *H.A.*, 25: 3588.

t WALLACE, T.
The manurial needs of fruit crops.
Agric. Rev., 1956, **1**(10): 14-22, illus.
Major and minor elements for tree and small fruits.

u WALLACE, T.
The nutrition of fruit crops—a retrospect.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 53-60.
A review with suggestions for future work.

v WEST, C.
When the amateur should pick and how he should store apples and pears.
Publ. roy. hort. Soc., undated, pp. 12, illus.

w WESTERN, N., AND SALLROTH, L.
Tillväxten hos äpple. **(Growth rates of apple fruits.)**
Fruktodlaren, 1955, **26**: 169-70.
Data on 3 varieties from 6 Aug. to 14 Sept., 1955.

x WIJSHOFF, J. W.
Een onderstammenproef bij Yellow Transparent in Zuid-Limburg. **(A rootstock experiment with Yellow Transparent in South Limburg.)**
Fruitteelt, 1956, **46**: 261-2, illus.
Combined with a pruning trial; planted 1949/50.

y WOODHEAD, C. E.
A review of the chief commercial apple and pear varieties grown in New Zealand.
Orchard. N.Z., 1956, **29**(1): 2-7.

SMALL FRUITS, VINES AND NUTS.

Small fruits.

(*See also* 2381, 2389, 2402, 2412, 2421, 2434, 2459, 2503f, p, r, 2504t, 2558b, e, g, h, j-l, n, t, v-y, 2692.)

2505. SOROKA, E. I.
***Actinidia* in a Moscow suburb.** [Russian.]
Agrobiologija, 1955, No. 4, pp. 276-8, illus.
Untreated herbaceous cuttings of *Actinidia* did not root, but when heteroauxin, at 1 : 1,000, was applied for 24 hrs about 50% of the cuttings taken in June rooted. With the "kiljčevanie" method, commonly used for vines [see *H.A.*, 23: 2722), even better results were obtained. The vitamin C content of *Actinidia kolomikta* was found to be 250 mg./% or 5 times higher than that of lemon juice.

2506. BRINGHURST, R. S., VOTH, V., AND CRANE, J. C.
Blackberry yields increased.
Calif. Agric., 1956, **10**(4): 5, 15.
Growth regulator sprays (containing beta-naphthoxyacetic+para-chlorophenoxyacetic acids) applied 3 or 4 times during full bloom to Boysen, Olallie and Thornless Logan varieties have given fruit yield increases of 12–18% in some cases. The average fruit weight on sprayed Boysen plants increased as the season advanced, but that of Olallie fruit decreased. Differences in fruit weight of Thornless Logan from sprayed and control plants were not significant.

2507. KIRCHHOFF, R.-H.
Entwicklungstendenzen bei Johannisbeersorten unter dem Einfluss der Austauschveredlung. **(Developmental tendencies in currants as affected by the use of scion varieties as rootstocks.)**
Gartenbauwiss., 1955, **2**: 269-73, bibl. 3, illus.
In this second report [for the first, see *H.A.*, 23: 3819] further data are presented on the size and cropping of 6 black, red or white currant varieties when unworked, worked on their own roots or worked on other varieties. The results so far obtained illustrate that the rootstock-scion combination influences vigour, yield, berry weight, fruit colour and composition, flavour and other factors. They also suggest the possibility of increasing yields per unit area by the close planting of combinations which combine dwarfing with heavy cropping.—Inst. Obstb., Techn. Univ. Berlin.

2508. GARNER, R. J., HATCHER, E. S. J., AND KEMP, R. W.
A comparison of black currant cuttings from stooled plants and fruiting bushes.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 61-3.
In comparisons involving 2 black currant varieties 4-year-old stool beds yielded far more cuttings per yard of row than fruiting bushes of the same age. Cuttings from the stools were easier to collect and rooted and grew as well as, or better than, cuttings from the fruiting bushes.

2509. SCHANDERL, H.
Die schwarze Johannisbeere. **(Black-currants.)**
Hess. Obstb., 1956, **11**(2): 24-5, from abstr. in *Beerenobstschrifttum*, 1956, No. 1, p. 8.
Selected bushes of the varieties "Silvergieters Schwarze" and "Rosenthals schwarze Langtraubige" were isolated from bee pollination by gauze cages, while others were freely pollinated by bees. Yields from bee-pollinated "Silvergieters Schwarze" were 3·8 times and from "Rosenthals schwarze Langtraubige" 2·5 times those from caged bushes.

2510. Johnston, S.
Blueberry varieties notes.
Amer. Fruit Gr, 1956, **76**(4): 28, 31, illus.
Blueberry varieties now recommended for planting in Michigan include Earliblue, Bluecrop, Blueray, Berkeley, Jersey and small plantings of Coville where a late variety is needed. Notes are given on these 6 varieties.

2511. (Hill, R. G., Jr.).
You can grow blueberries profitably.
Amer. Fruit Gr, 1956, **76**(4): 26, illus.
Various methods of mulching were tested on blueberries at Ohio Agricultural Experiment Station. The best results were obtained by mulching with sawdust and subsequently working it into the soil. The next best treatments, in descending order of effectiveness, were sawdust allowed to lie as a mulch, peat moss mulch and straw mulch. All treatments gave better results than clean cultivation. Application of 3–4 inches of sawdust a year is recommended. Iron chlorosis can be corrected for 3 years by a single application of chelated iron [see also *H.A.*, 26:332].

2512. Trevett, M. F., and Hilborn, M. T.
Blueberries, soils, and micro-organisms.
Maine Fm Res., 1956, **3**(4): 3-5, illus.
It has been observed that vigorous blueberry rhizomes are found in soils containing a fairly thick surface layer of organic matter. The presence of *Rhizoctonia* and *Phoma* species in blueberry soils appears to be beneficial. In preliminary tests it has been shown that the fungus count in good blueberry soils is markedly higher than in less productive soils.

2513. Massachusetts.
The Cranberry Station, East Wareham, Mass.
A.R. Mass. agric. Exp. Stat., 1953–1954, pp. 41-5.
Weed control: A kerosene spray in mid-May followed after 4 days by a spray of Stoddart Solvent killed all brambles (*Rubus* spp.), and although the current cranberry crop was ruined the vines were not injured. Half and half mixtures of Stoddart Solvent and kerosene gave very effective control of loosestrife. Sprays of the butoxy-ethanol ester of 2,4,5-T killed almost all the poison ivy but ruined the 1953 crop and the 1954 crop prospects. Dalapon at 20 lb./acre produced slight vine damage, but rice-grass control was almost complete. A 60-day summer flood gave more than 90% kill of blackberries and morning glory. *Soil water:* Drainage by perforated plastic tubing was promising. *Fertilizer studies:* Urea and Uran 32 applied with dieldrin to control root grubs [*Rhabdopterus picipes*] have proved satisfactory sources of N. *Cranberry insects:* Root grubs were controlled with spring applications of emulsions of heptachlor, aldrin, dieldrin, endrin and isodrin at 10 lb./acre, and also by post-harvest dieldrin applications. Aerial applications of dieldrin emulsion gave excellent control of cranberry weevil [*Anthonomus musculus*], green cranberry spanworm [*Anavitrinella pampinaria*], and false armyworm, but not of black-headed fireworm [*Rhopobota naevana*]; the fireworm was, however, destroyed by aerial applications of malathion. Sprays of EPN 300 and malathion gave better control of cranberry fruitworm [*Mineola vaccinii*] than rotenone plus fish oil soap.

2514. Anon.
Wild elderberry is tamed, named.
Amer. Fruit Gr, 1956, **76**(4): 61.
The Adams elderberry, the only named variety in existence, is now available to growers from the N.Y. Fruit Testing Association, Geneva. It is vigorous and productive and has large berries. Elderberries can be propagated from hardwood cuttings, 8–10 in. long, taken in late winter and kept moist and cool until planting in the spring.

2515. Simonova, M. N.
Development of large fruited, *Sphaerotheca*-resistant, varieties of gooseberry. [Russian.]
Agrobiologija, 1955, No. 4, pp. 272-5.
At the Moscow Fruit Experimental Station relatively good mildew resistance, easy rooting, vigorous growth and high yielding capacity were shown by some gooseberry varieties obtained by crossing European varieties with the American Haughton and other resistant forms. To improve fruit size the new selections were again crossed with European varieties.

2516. Sergeeva, K. D.
Spineless gooseberries. [Russian.]
Priroda, 1955, **44**(10): 96-8, illus.
Notes are given on methods of sexual and vegetative hybridization between gooseberry and black currant, and on crossing the North American hybrid gooseberry, *Grossularia robusta*, with European cultivated varieties.

2517. Bundessortenamt, Rethmar.
2. Zwischenbericht über die Ergebnisse der 1. Versuchsserie von Wertprüfungen mit Himbeeren, Erntejahr 1955. **(Second progress report on the results from the 1st series of evaluation trials with raspberries, 1955),** 1956, pp. 21.
At 5 sites in Western Germany trials with 15 raspberry varieties are in progress. Results for 1955 are tabulated for growth, length of cane, sucker formation, disease incidence, start of flowering, yield, time of ripening and fruit quality.

2518. Ledin, R. B.
***Rubus* trials in South Florida.**
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 272-4, bibl. 14, illus.
Species which have shown some promise for Florida conditions include *Rubus albescens*, *R. urticaefolius*, *R. pinnatus*, *R. rigidus*, *R. moluccanus*, *R. morifolius*, *R. ellipticus*, *R. pseudosieboldii* and *R. phoenicolasius*.

2519. Larsson, G.
Odlingsförsök med åkerbär (*Rubus arcticus*).
(Cultivation studies with *Rubus arcticus*.)
[English summary 1½ p.]
Sver. pomol. Fören. Årsskr. 1955, 1956, **56**: 183-95, bibl. 6, illus.
The Arctic raspberry in Sweden fruits best in districts where the average summer temperature is 11–12° C. Eight clones were planted out, and great differences in growth and fruiting were observed. The fruit is difficult to pick as it is small and does not come away from the calyx easily. Trials showed that the plants need

a clean soil with a high humus content and a low pH. Only vigorous plants should be used and these should be set about 2 yards apart. Manuring with sulphate of potash and sulphate of ammonia (10 g./sq. m. of each), and irrigation and shading may be of value.

2520. Williams, I. H., and Hudson, J. P.
Effect of environment upon the growth and development of raspberry canes.
Nature, 1956, **177**: 798-9, bibl. 3, illus.

Of the 3 developmental phases of raspberry canes the first has been described earlier [see *H.A.*, 24: 206 and 1240; and 25: 3410]. Phase 2, the growth of the vegetative shoot in its first year, was studied at temperatures of 70°, 60° and 50° F. in combination with daylengths of 14 and 9 hours. At temperatures of about 60° F. elongation occurs only under long-day conditions, whereas at lower temperatures rosettes form, and at higher temperatures shoots elongate, irrespective of length of day. These environmental responses were not confined to young shoots or to growth near ground-level, canes grown in heated glasshouses, for instance, attaining heights of over 12 feet without showing any tendency to become dormant. Phase 3, flowering and fruiting, was initiated by exposing plants with elongated canes to temperatures of 35–40° F. for periods of up to 6 weeks. During exposure to low temperatures the canes became dormant. When laterals began to develop after the return of the plants to higher temperatures, length of day had little influence on further growth of the laterals or on flower and fruit formation. Exposure of the canes to a period of short days at 50° F. before giving them the low temperature of 35–40° F. materially influenced the effectiveness of the latter treatment. Young plants with fewer than 12 nodes could not be induced to flower.—Univ. Nottingham.

2521. Habran, R., and Lemaire, R.
Les travaux de recherches sur le fraisier en Belgique. (**Research work on strawberries in Belgium.**)
Fruit belge, 1956, **24**: 51-3, 50.

Work on the problem of degeneration which is affecting strawberry plants in Belgium is briefly reported. In plant studies the following points were noticed: Weak plants improved in a wet season, while more vigorous plants were more resistant to drought. Fruits not fully coloured had a higher vitamin C content than ripe fruits. Chemical soil analyses were of little value in determining soil suitability for strawberry growing. Increasing phospho-potassic contents in mineral fertilizers did not significantly affect plant growth; no response to increasing rates of farmyard manure was observed. In studies on pests and diseases the following results were obtained: Fruit rot was controlled by TMTD applications before and during flowering, or by agrimycin; promising mildew control was obtained by 0·5% agrimycin; no treatment has yet been found to replace methyl bromide fumigation for *Tarsonemus* mite control; good control of red spider was obtained with phosphoric acid esters or chlorocide. The chemicals tested for weed control did not give satisfactory results. Early planting (20 August) gave the heaviest fruit yields the following year (115 kg./are). Strawberries were produced at Christmas by starting supplementary illumination in mid-October.

2522. Rogers, W. S.
The variety question in strawberries.
Comm. Gr, 1956, No. 3142, pp. 345, 347, 349.

The performance of well-known varieties as well as several of the new Cambridge strawberries is discussed, and data are presented from trials at East Malling.

2523. Henriksen, A.
Dyrkningsforsøg med nyere jordbaersorter tiltrukket ved Spangsbjerg. (**Cultural trials with newer strawberry varieties bred at Spangsbjerg.**) [English summary, pp. 2.]
Tidsskr. Planteavl, 1955, **59**: 506-29, illus.

Trials were carried out at 4 Danish research stations with 5 strawberry varieties bred at Spangsbjerg (Ydun, Freja, Rubin and 2 unnamed selections). Data on yields (1946 and 1947) and other characteristics are presented in comparison with two standard varieties. Ydun is now widely grown in Denmark.

2524. Bundessortenamt, Rethmar.
1. Zwischenbericht über die Ergebnisse der 3. Versuchsserie von Wertprüfungen mit einmaltragenden Erdbeeren, Erntejahre 1954–1955. (**First progress report on the results of the 3rd series of evaluation trials with summer-fruiting strawberries, 1954-1955**), 1956, pp. 25.

Thirty-two strawberry varieties were planted at 6 sites in Western Germany and their performance was evaluated and tabulated. Observations were made on growth, disease and pest incidence, frost damage, start of flowering, runner formation, yield, time of ripening and fruit quality.

2525. Bundessortenamt, Rethmar.
2. Zwischenbericht über die Ergebnisse der 2. Versuchsserie von Wertprüfungen mit einmaltragenden Erdbeeren, Erntejahr 1955. (**Second progress report on the results of the 2nd series of evaluation trials with summer-fruiting strawberries, 1955,** 1956, pp. 6.

Results from 3-year-old plantations at Horneburg and Kassel are tabulated for 28 varieties. Evaluations on growth, start of flowering, yields, time of ripening and fruit quality are tabulated.

2526. Łucka, M., and Kropp, K.
Badania nad odmianami truskawek pod względem przydatności dla przemysłu przetwórczego. (**Studies on the suitability of different varieties of strawberry for the processing industry.**) [English and Russian summaries ¼ p. each.]
Prace Inst. Lab. bad. Przem. rol. spoż, 1955, 5(4): 30-7, bibl. 15, illus.

Of 86 varieties evaluated 10 were selected as good for processing. These are grouped according to their suitability for canning as whole fruit, jam or pulp.

2527. Szaák, M.
Szamóca fajtameghatározási kísérlet. (**Trials for strawberry variety classification.**) [Russian and English summaries ½ p. each.]
Agrártud. Egy., 1953 (issued 1954), **17**(1, Part 1): 65-78, bibl. 9, illus.

In 1951 a trial was started to determine the pheno-

logical and morphological characters of several strawberry varieties. The 24 varieties examined have been classified into 3 groups, typified by Mme Moutot, Laxtons Noble and Huxley, respectively.

2528. Anon.
Nouveauté: un fraisier grimpant. (A climbing strawberry plant.)
Rev. hort. Paris, 1956, **128**: 1423.
The variety Truffaut-Prodige will climb to a height of 2 m. in a season and produce 4 kg. of fruit. The climbing runners are cut down in the autumn, and the plant overwinters without protection.

2529. Kropp, K.
Badania nad składem chemicznym truskawek. (Studies on the chemical composition of strawberries.)
Przem. Spoż., 1955, No. 3, pp. 108-10, from abstr. in *Polish tech. Abstr.* [in English and Russian], 1956, **1**(21), No. 4023.
Analyses of 20 varieties have shown that strawberries grown in the mountain region have lower sugar and l-ascorbic acid contents but higher contents of insoluble solids and acids than those grown in Central Poland.

2530. Voth, V., and others.
Fall planted strawberry plants.
Calif. Agric., 1955, **9**(12): 6-7, illus.
Strawberry plants (var. Lassen) dug from the nursery bed in a frost-free location in November and set in December yielded ⅔ of a normal crop the following year, and significantly more fruit than somewhat immature October-dug plants. When October-dug plants were set out after 3 weeks' cold storage, only a 60% stand resulted. Cold storage for 3 weeks did not affect stand or production of November-dug plants. Plants dug at the end of November but not planted till February produced very little fruit.—Univ. Calif., Davis.

2531. Arney, S. E.
Studies of growth and development in the genus *Fragaria*. VI. The effect of photoperiod and temperature on leaf size.
J. exp. Bot., 1956, **7**: 65-79, bibl. 11.
It has been demonstrated that photoperiod plays the dominant role in bringing about the reduction in leaf size and in the number of cells in the shortening days of autumn. Strawberry plants in various physiological conditions all respond similarly by prolonging the period of cell division in expanding leaves in response to long-day treatment, and by curtailing the period of cell division in short days. At the lowest temperatures within the normal range for active growth there is a reduction in leaf size and in cell size, and a less marked reduction in cell number. The effect of artificial illumination is shown to depend on the duration of the daily light period, and not on the total dose of light. Light intensity has no effect on leaf growth over the ranges used, either from fluorescent lamps or from high pressure mercury vapour lamps. The relation between the master reaction determining the cessation of cell division and that determining the cessation of vacuolation is discussed. [Author's summary.]—Univ. Coll., Cardiff. [For part VII see *H.A.*, 26: 1480.]

2532. Smeets, L.
Influence of the temperature on runner production in five strawberry varieties.
[Dutch summary ⅓ p.]
Euphytica, 1956, **5**: 13-17, bibl. 6.
Plants of Deutsch Evern, Oberschlesien, Climax, Jucunda and Mme Moutot were grown at 17°, 20°, 23° and 26° C. Varietal differences in the number of runners produced were observed. In general runner number increased with increased temperature, but Mme Moutot had a lower optimum temperature for runner production than had the other varieties. The duration of runner production was also affected by temperature.—Inst. hort. Plant Breed., Wageningen. [See also *H.A.*, 25: 2531 and 26: 1481.]

2533. Denisen, E. L.
Inhibiting strawberry runners with maleic hydrazide.
Market Grs' J., 1956, **85**(3): 16, 18, illus.
Sprays of MH-30 and MH-40 applied in June at 2,000 p.p.m. to Dunlap, Robinson and Blakemore strawberries gave effective runner inhibition. A treatment of 3 MH-40 sprays applied during July to September at 1,000 p.p.m. and 2,000 p.p.m. to a new plantation of Blakemore was compared with untreated thinned and matted rows. Plant number per square foot was reduced from 13·2 in matted rows to 7·5 or 4·7 in the MH-treated rows; in hand-thinned rows plant number was 2·2. Early fruit yields from MH-treated rows were 30% higher than from matted rows, and total yields were 15% higher. Fruit size was increased by 12% compared with the matted rows in the early crop and by 18% in the total crop.—Iowa St. Coll., Ames.

2534. Mosse, B.
Fructifications of an *Endogone* species causing endotrophic mycorrhiza in fruit plants.
Ann. Bot. Lond., 1956, **20**: 349-62, bibl. 12, illus.
The fructifications of a hitherto undescribed *Endogone* sp. have been found in organic connexion with mycorrhizal strawberry roots grown in pots in a greenhouse. By inoculating sterilized soil with these fructifications and with spores excised from them it has been possible to produce typical vesicular-arbuscular infections in strawberry, apple, and a number of other plants. These inoculation experiments constitute the first record of the establishment of endotrophic mycorrhizal infection in plants raised under aseptic conditions. [Author's abstract.]—East Malling Res. Stat.

Vines.

(*See also* 2434, 2503r, z, 2558a, c, d, f, i, o, q-s, u, 2560, 2693, 2694, 3208.)

2535. Samarakis, B. A.
Rapport général sur la situation de la viticulture dans le monde et les suites données aux résolutions du Comité de l'O.I.V. (General report on the world viticultural situation and on the effects given to the resolutions of the committee of the O.I.V.)
[*Proc.*] *VIIIe Congr. int. Vigne Vin, 1955*, Santiago, Chile, 1956, mimeographed as [*Publ.*] *Off. int. Vin* **2-1956-GR**, pp. 44.

The subjects covered are statistics for various countries of the area under vines, production of grapes and wine, consumption, exports and imports, and the action taken in various countries on the committee's resolutions on such subjects as choice of soils and varieties, reduction of excessive production and limitation of new planting.

2536. Theron, C. J., and Venter, P. J.
In search of good wine.
Fmg S. Afr., 1956, **31**: 19-24.
In a long-term viticultural and oenological research project varieties, training, rootstocks and port production were studied. No marked differences in wines from trellised and untrellised vineyards were found, but yields and vigour of Riesling and Pontac were higher from trellised vines. Four rootstocks were also tested, but differences in the wines produced were not significant. Richter 99 resulted in the highest yields.—S.E. Coll. Agric., Stellenbosch.

2537. Fujii, T.
Origin and development of root primordia in vine cuttings. [Japanese, with English summary 8 lines.]
J. hort. Ass. Japan, 1955, **24**: 160-4, bibl. 9, illus.
Investigations on rooting in vine cuttings showed that: (1) All root primordia arose from between the outer part of the newly formed xylem and the phloem region; (2) primordia became visible 30 days after planting; (3) the optimum temperatures for initiation and development were different. Development is illustrated in a series of photographs.

2538. Kvirikašvili, E.
A new method of raising phylloxera-resistant vine rootstocks. [Russian.]
Sad i Ogorod, 1956, No. 2, pp. 58-9.
The method developed in Georgia consists of training phylloxera-resistant varieties as high, horizontal cordons. These produce shoots suitable for cuttings (110 cm. long) in much greater number and 2–3 years earlier than plants grown by the conventional method. Mechanized cultivation and ease of harvesting (cutting of shoots) are among other advantages claimed.

2539. Peyer, E., and Zwicky, P.
Versuche in der Rebschule mit Bodenheizung, Bodenbedeckung und Rebveredlung. **(Experiments in the vine nursery on soil heating, soil covers and vine grafting methods.)**
Schweiz. Z. Obst- u. Weinb., 1956, **65**: 97-103, illus.
In plots with electric soil warming the growth of shoots was much stronger than in the controls and the yield of saleable grafts was 28% higher. Peat spread between the plant rows also increased soil temperature and yield of saleable grafts. Strips of polyethylene film laid between the rows resulted in higher soil temperatures in the morning than occurred in unprotected soil and also increased the yield of saleable grafts. The use of polyethylene film was cheaper than heating by electricity.—Wädenswil.

2540. Blanc-Aicard, D., and Drouineau, G.
Capacité de saturation en calcium des porte-greffes de vigne et résistance à la chlorose calcaire. **(Calcium saturation capacity of vine rootstocks and resistance to calcium chlorosis.)**
Progr. agric. vitic., 1956, **145**: 173-5.
Investigations on 9 vine rootstocks showed that a relationship existed between their Ca saturation capacity and their resistance to lime-induced chlorosis. Those with a high Ca saturation capacity, such as *Vitis riparia*, were very susceptible to chlorosis and those with a low saturation capacity, such as 41 B (*V. vinifera* × *V. berlandieri*), were very resistant.

2541. Leyvraz, H.
Expériences sur les porte-greffes (P.-G.) pour la reconstitution du vignoble. **(Trials on rootstocks for the reconstitution of vineyards.)**
Rev. romande Agric. Vitic., 1956, **12**: 33-6.
The performance of a number of rootstocks with Chasselas Fendant roux as scion is being studied in trials laid down at Pully between 1940 and 1949. A table shows the suitability of the various stocks for soils of different textures with Ca contents ranging from 0–10% to over 60%, data being presented on fruit and must yields and on growth. It is considered that the new stock Grizot 1 (G.1) should be used more widely and could well replace Riparia × Rupestris 3309 on slightly compact or humid clay soils.

2542. Čečuk, S.
Prilog poznavanju sortimenta podloga u vinogradarstvu Hercegovine. **(A contribution to the study of vine rootstocks in Herzegovina.)** [French summary ½ p.]
Rad. poljopr.—šumarsk. Fak. Univ. Sarajevu, 1954, **3**: 191-206, bibl. 27, illus.
In this district of Yugoslavia droughts are frequent, the soil is calcareous and thin, and infectious degeneration of vines is prevalent. With these facts in view the 3 basic rootstocks recommended are Berlandieri × Rupestris Richter 110, Riparia × Berlandieri 161-49 Couderc and Cordifolia-Rupestris × Riparia Grande Glabre 44-53 Malegue. The following 3 are also suggested for particular purposes: Berlandieri × Aramon-Rupestris Ganzin 150-15 Malegue, Chasselas × Berlandieri 41 B and Solonis × Riparia 1616 Couderc.

2543. Borisovskiĭ, N. Ja.
The depth of planting vines under conditions of the Donbas. [Russian.]
Vinodelie i Vinogradarstvo, 1956, No. 1, pp. 40-2, bibl. 1.
In the Donbas, where frost damage to the roots constitutes a real danger, vegetatively propagated vines should be planted 55–60 cm. deep on chernozem soils or 70 cm. deep on sands. Young seedlings should be planted in 40–45 cm. deep furrows or holes which are gradually filled in up to the time of fruiting.

2544. Turković, Z.
Wirtschaftswert und Schnitt der Rebsorten. **(Management and pruning of vine varieties.)** [English, French and Spanish summaries 4 or 5 lines each.]
Mitt. Klosterneuburg, Ser. A, 1956, **6**: 20-5.

The author examines the relationships between vine pruning and planting distance, using bunch weight of grapes and number of bunches produced by each bud as measurements.

2545. Zimmermann, J.
Die Holzreife als Prüfungsfaktor für die ökologische Eignung von Rebenneuzüchtungen. (**Wood maturity as a criterion of the ecological requirements of new vine varieties.**) [English, French and Spanish summaries ⅓ p. each.]
Mitt. Klosterneuburg, Ser. A, 1956, **6**: 1-20, bibl. 14.

Wood maturity has been used as an indication of the suitability of new vine varieties for a certain area. The water content of 1-year-old shoots towards the end of the vegetative period was used as a measure of physiological ripeness. Observations indicated that environmental conditions influence the water content of shoots. The anatomy of the shoots was examined, vinifera varieties being compared with rootstock varieties. The ratio of the conducting surface to xylem tissue reflects the effect of variety and of site. The ratio of phloem to xylem is determined by the type of water absorption, the ratio being larger with impeded absorption and smaller with easy absorption. There was also a relation between pith size and shoot growth. The application of the method is demonstrated with reference to 3 new varieties.

2546. Ivanova, E. B.
The use of hybrids with male flowers for artificial pollination. [Russian.]
Vinodelie i Vinogradarstvo, 1956, No. 1, pp. 42-5, illus.

Hybrid vines with male flowers provide a useful source of pollen for artificial cross-pollination, especially of varieties with functionally female flowers. The pollinators should be selected for abundant flowering starting 3–5 days before that of the cropping varieties, for large inflorescences and for frost resistance.

2547. Vidal, J.-P., and Delobbe, H.
La fumure de la vigne au Maroc. (**Vine manuring in Morocco.**)
Progr. agric. vitic., 1956, **145**: 269-78, 301-7, illus.

Current soil amendment and fertilizer practices in Morocco are outlined and notes are given on fertilizer experiments made at the Mèknes School of Agriculture in 1951/55. Soil injections of liquid N and K were very efficacious even though applied to vines in good health, but leaf analysis did not satisfactorily reflect the improved nutrient status resulting from the injections. Dry forms of N, P and K applied either on the surface or at a depth did not give promising results.

2548. Liwerant, J.
Relation entre les résultats culturaux et la diagnostic foliaire d'une vigne. (**The relation between cultural results and leaf analysis in a vineyard.**)
Ann. agron., 1955, **6**: 882-5.

Different levels of N, P and K were given to a young vineyard in several combinations. Each plot was given a base dressing of either basic slag or superphosphate. Grape and sugar yields were highest from plots receiving the complete fertilizer, but yields from the superphosphate series were somewhat higher than those from the slag series. Analyses showed that the total mineral content of leaves from plots receiving complete fertilizer was only slightly greater than that from unfertilized plots. Maximum yields were obtained at an NPK balance of 64·1 : 11·6 : 24·3.

2549. Ceĭtlin, M. G.
Foliar nutrition of vines in the Uzbek SSR. [Russian.]
Vinodelie i Vinogradarstvo, 1955, No. 8, pp. 27-31.

On a 4 ha. experimental plot 25-year-old vines of 4 varieties were sprayed at various times with solutions of ammonium nitrate, superphosphate, potassium chloride, boric acid and manganese sulphate. Yield improvements were obtained from all treatments, the magnitude of which depended on the number, time and concentration of the applications. Mean weight increases in branches of all 4 varieties amounted to 21·6% as a result of superphosphate treatment, 24·7% with ammonium nitrate, 25·8% with potassium chloride, and 31·8% with a mixture of all three. Foliar nutrition also improved the sugar content of the grapes and increased the number of the following season's flower buds by 2·6–13·4% as compared with the controls.

2550. Bognár, K.
Tőzeg a homoki szőlőkben. (**Peat in sandy vineyards.**)
Kertészet és Szőlészet, 1954, **1**: 3, from English abstr. in *Hungarian agric. Rev.*, 1955, **4**(2): 6.

Six years' trials on peat applications to sandy soils has shown that composting before incorporation is unnecessary so long as sufficient artificial fertilizer is also applied. During the summer of 1952 vines on plots fertilized with stable manure suffered from the drought, but on peat-manured plots no drought injury was observed. Peat decomposed more slowly than stable manure, and therefore its moisture-retaining properties lasted longer in the soil. The peat should be covered by at least 30 cm. of soil to prevent it from drying out in dry summers. Quality and quantity of grape yields from the peat plots were similar to those from stable manure plots, but shoot development was stronger and wine yields were greater.

2551. Hill, R. G., and Beattie, J. M.
Mulch will build profits for you!
Amer. Fruit Gr, 1956, **76**(4): 11, 31, illus.

In recent experiments in Ohio average annual yields of Concord grapes were increased by 1·5 tons per acre by mulching with 5 tons of straw per acre annually. Raspberry yields were increased by 670 pints per acre by a similar treatment. In view of the higher yields, the saving of labour for cultivation and the greater ease of working, it is estimated that $15–20 a ton could profitably be spent on obtaining and applying mulch material on berry and tree fruit plantings.

2552. Litvinov, P. I.
Increasing the activity of the root system of vines. [Russian.]
Sad i Ogorod, 1955, No. 11, p. 70-3, illus.

Deep cultivation (55–60 cm.) combined with manuring and root pruning greatly increased the growth and branching of absorbing roots. Yields during the first year following the treatment were increased by 10% or when irrigation was applied by 38%, and during the second year the increases were even higher. The autumn proved the best time for treatment.

2553. Kaan, J., and Langerak, D. I.
Het verpakken van druiven in cellofaan puntzakken. (**Grape packaging in cellophane bags.**)
Fruitteelt, 1956, **46**: 394, illus.
When grapes were packed in "coated" cellophane there was a rapid loss of fruit quality owing to the high humidity in the bag. When P.T. cellophane or cellulose acetate were used high humidity was avoided, and the fruit remained in good condition.—I.B.V.T., Wageningen.

Nuts.

(*See also* 2558m, p, 2564, 2670e.)

2554. Sárai, V.
Az "Akali 60" mandulafajta. (**The almond variety "Akali 60".**)
Agrártud. Egy., 1953 (issued 1954), **17**(1, Part 1): 59-64, illus.
The behaviour of the almond variety Akali 60 has been observed in Hungary over a 13-year period. The kernel forms 60% of the nut by weight and has a 55·7% oil content. The flowers are frost-resistant but somewhat susceptible to *Monilia* infection. No pruning for crown formation is necessary as the tree branches naturally at 80–100 cm. The variety yields almost twice as heavily as Burbank.

2555. Nienstaedt, H., and Graves, A. H.
Blight resistant chestnuts: culture and care.
Circ. Conn. agric. Exp. Stat. **192**, 1955, pp. 18, bibl. 8, illus.
The American chestnut (*Castanea dentata*) is now almost extinct in the eastern U.S.A. as a result of the spread of *Endothia parasitica*. Attempts are being made in Connecticut and at Beltsville to breed blight-resistant hybrids for timber and nut production. A *C. mollissima*×*C. seguini* hybrid has shown promise as an orchard tree in southern latitudes. Certain varieties of Chinese chestnut are also recommended for nut production. Advice is given on the culture of Chinese and hybrid chestnuts, on harvesting and storing the nuts, on pest and disease control and on sexual and vegetative propagation.

2556. (Stark, P., Jr.)
A new pecan for the North.
Amer. Fruit Gr, 1956, **76**(3): 38, illus.
A new self-sterile pecan variety, Starking Hardy Giant, has a short growing season (140–150 days) and is therefore particularly suitable for growing in the northern U.S.A.

2557. Molotkovskiĭ, G. H.
The germination capacity of oak and walnut seeds in relation to their position in the soil. [Russian.]
Doklady Akad. Nauk. S.S.S.R., 1955, **102**: 637-9, bibl. 2.
Results of germination tests show that by disturbing the polarity of the seed embryo, i.e. by planting upside down, seedling vigour was increased.

Noted.

2558.

a Artozoul, J., and Baudel, J.
Enseignements de la vieille vigne dans le sud-ouest de la France. (**Information on the old vine varieties of south-western France.**)
Progr. agric. vitic., 1956, **145**: 141-51.
Grown in the pre-phylloxera era.

b Avent, K. L.
Berry fruit growing in Victoria. I. Strawberries.
J. Agric. Vict., 1956, **54**: 73-83, illus.
Varieties and cultivation.

c Avramov, L., and Briza, K.
Colour change in the berries of the vine variety Prokupac. (Preliminary communication.) [Serbian, with German summary 8 lines.]
Rev. Res. Work Fac. Agric. Belgrade, 1955, **3**(1): 237-42, bibl. 4, illus.
Yellowish-green grapes on black Prokupac, due probably to mutation.

d Barskiĭ, Ja. S.
Guiding bees for the pollination of vines. [Russian.]
Sad i Ogorod, 1956, No. 4, p. 64.
Flight guidance by means of vine-flower-scented syrup.

e Boll, H. L., and Colby, A. S.
Crimson Cone, a new raspberry variety.
Fruit Var. hort. Dig., 1955, **10**: 44, illus.
A mid-season, tall variety from Illinois, showing little winter die-back.

f Brock, R. B.
Aspects of grape growing.
J. roy. hort. Soc., 1956, **81**: 183-5, illus.
Small-scale trials in Surrey, England; see also *H.A.*, 26: 1489.

g Brossier, J.
Les variétés de fraisiers au jardin d'amateur. (**Strawberry varieties for the amateur's garden.**)
Jardins Fr., 1956, **2**: 54-9, illus.
Perpetual and summer-fruiting varieties.

h Bryden, J. D., and Johnson, J. F.
Trailing berries and bush fruits.
Agric. Gaz. N.S.W., 1955, **66**: 625-9, illus.
The culture of loganberries, boysenberries and youngberries.

i COSMO, I., COMUZZI, A., AND RUBIN, V.
Indagini sulla ricostituzione viticola delle Venezie . . . Provincia di Padova . . . —Secondo contributo . . . (**Studies on vineyard reconstitution in Venetia . . . Results of trials of European wine vines and rootstocks in the Province of Padua from 1926 onwards. 2nd contribution. Zone of the Euganei Hills; sub-zone of very calcareous soils.**) [English summary ¼ p.]
Ann. Sper. agrar., 1956, **10**: 373-402, bibl. 8, illus.
Variety and rootstock trials; for part I see *H.A.*, 26: 1510h.

j DARROW, G. M.
Recent developments in strawberry production.
Proc. 100th annu. Mtg N.Y. St. hort. Soc., 1955, pp. 108-12.
In the U.S.A.

k DOW, G. F., AND OTHERS.
Producing blueberries in Maine.
Bull. Me agric. Exp. Stat. **479**, revised 1955, pp. 48, bibl. 3, illus.
Considerably revised; for 1st edition see *H.A.*, 20: 1377.

l FALCH, J., AND STRAUSS, E.
Abschlussbericht über Sortenvergleich- und Leistungsprüfungen im Erdbeersortiment 1951–1954. (**Final report on strawberry varieties and yields 1951-1954.**) [English, French and Spanish summaries ¼ p. each.]
Mitt. Klosterneuburg, Ser. B, 1956, **6**: 55-64, bibl. 2.
An evaluation of 23 varieties in the Vienna area.

m FREGOLA, C.
Il noccioleto in Piemonte. (**The filberts in Piedmont.**)
Ital. agric., 1956, **93**: 232-4, illus.

n GROOTEN, R.
La culture des espèces fruitières à petits fruits en Belgique. (**Small fruit growing in Belgium.**) [English and German summaries 4 lines each.]
Rev. Agric. Brux., 1956, **9**: 249-70.
Strawberries, gooseberries, currants and raspberries.

o VAN HAARLEM, J. R., CROWTHER, R. F., AND TRUSCOTT, J. H. L.
Variety tests of grapes for wine.
Bienn. Rep. hort. Exp. Stat. Prod. Lab. [*Vineland*] *for 1953 and 1954*, pp. 130-52.
Tabulated data on 39 varieties.

p HINES, C.
Certain practices are important for successful pecan production.
Bett. Crops, 1956, **40**(1): 23-6, 48-9, illus.
Varieties and cultivation in Mississippi.

q KONDO, I. N.
Dormancy (non-sprouting) of vine buds. [Russian.]
Doklady Akad. Nauk. S.S.S.R., 1955, 102: 633-6, bibl. 12.
Phases of dormancy, their duration and processes associated with them discussed.

r MANUEL, H. L.
Bordelais spalier pruning.
Agric. Gaz. N.S.W., 1955, **66**: 645-8, illus.
Suitable for rod-pruned vines.

s MANZO, P.
L'uva precocissima Anna Maria e le sue caratteristiche (Ubizzoni n. 4). (**The very early Anna Maria grape and its characteristics (Ubizzoni no. 4).**)
Riv. Vitic. Enol., 1956, **9**: 3-6, illus.
A Perla di Casba × David hybrid.

t MINISTRY OF AGRICULTURE, LONDON.
Gooseberries.
Adv. Leafl. Minist. Agric. Lond. **215**, revised 1955, pp. 5.

u MOTTS, G. N.
Grape grader's manual.
Ext. Folder Mich. St. Coll. **F-200**, 1955, 1 folded sheet.
Michigan regulations for grading and packing.

v MOULTON, J. E.
Red—black—purple raspberry varieties.
Amer. Fruit Gr, 1956, **76**(4): 58, illus.

w REID, R. D., AND WOOD, C. A.
Fruit variety trials. III. Initial trials of Talisman and other Auchincruive strawberry selections.
Scot. Agric., 1956, **35**: 213-18, bibl. 1, illus.
In progress at the Mylnefield and Auchincruive stations of the Scottish hort. Res. Inst.

x SEEGMILLER, C. G., JANG, R., AND MANN, W., JR.
Conversion of radioactive hexoses to pectin in the strawberry.
Arch. Biochem. Biophys., 1956, **61**: 422-30, bibl. 15.

y SMIT, W.
Het nieuwe kruisbessenras 'Goudbal'. (**The new gooseberry variety 'Goudbal'.**)
De Boomkw., 1955, **11**(4): 30, from abstr. in *Beerenobstschrifttum*, 1956, No. 1, p. 9.
A large yellow-fruited variety.

PLANT PROTECTION OF DECIDUOUS FRUITS.

General.

(*See also* 2739.)

2559. SOENEN, A.
Wörterbuch bedeutender Krankheiten und Schädlinge in Land- und Gartenbau. **(Dictionary of important diseases and pests occurring in agriculture and horticulture.)**
Höfchen-Briefe, special edition, 1955, pp. 55.

The scientific name is followed by the common names in German, English, Spanish, French, Italian and Dutch. The scientific names are listed alphabetically under flies, moths, hymenoptera, beetles, bugs, spiders, rodents, crustaceans, molluscs, nematodes, fungus diseases, bacterial diseases and host plants. [An earlier edition is noted in *H.A.*, 18: 1771.]

Disturbances of nutrition or of unknown origin.

(*See also* 2358, 2363.)

2560. ONO, T., AND OTHERS.
Effects of boron on the "Ebi" disease of grapevines. II. [Japanese, with English summary ½ p.]
J. hort. Ass. Japan, 1956, **24**: 227-32, bibl. 3, illus.

Soil applications of 20 or 40 lb. boric acid per acre or foliage sprays at 0·3–0·5% improved growth, fruit set, bunch weight and yields of B-deficient vines on various soils, and approximately doubled the B content of the leaves. The residual effect lasted 2 years or more.

2561. SCHANDER, H.
Beiträge zur Frage der Bodenmüdigkeit bei Obstgehölzen. II. **(Contributions to the problem of soil sickness with fruit trees. II.)**
Gartenbauwiss., 1955, **2**: 233-60, bibl. 72, illus.

From the results of work reported here and earlier [see *H.A.*, 26: 1521] it is concluded that nematodes must be ruled out as a primary cause of soil sickness, nematode infestation of the roots being a secondary phenomenon only. Observations, moreover, suggest that the roots of "sick" and healthy plants attract different species. The author also reviews the symptoms of soil sickness on fruit trees, the factors that affect the malady and the measures that reduce or cure it. He strongly supports the toxin theory. The evidence suggests that the toxin is a decomposition product of dead roots rather than a secretion from living roots. Formation and decomposition of the toxin are the result of biochemical processes in the soil, which would explain differences in the incidence of the trouble under different soil and climatic conditions. From all the observations made so far it may be deduced that the toxin is a growth inhibitor, which is active at very low concentrations; it probably consists of several growth inhibiting substances with identical qualitative but different quantitative physiological effects.—Inst. Obstb., Techn. Hochsch., Hannover.

2562. MEZZETTI, A.
Una complessa alterazione delle mele. **(A multiple disorder of apple.)**
Riv. Fruttic., 1956, **18**: 133-7, bibl. 14, illus.

The chief symptoms of disorder of unknown origin affecting fruits of Abbondanza apples on seedling rootstocks growing in Bologna were discoloured cracks in the skin and common and ring mosaic. The flesh was more or less normal.—Ist. Pat. veg. Univ. Bologna.

2563. MEZZETTI, A.
La plara delle mele. I.—Osservazioni e ricerche sulla morfologia dell'alterazione. **(Apple lenticel rot. I. Morphology.)** [English summary ¾ p.]
Ann. Sper. agrar., 1956, **10**: 471-94, bibl. 15, illus.

"Plara", a non-parasitic rot believed to be connected with sap circulation, is differentiated from *Gloeosporium* lenticel rot.—Lab. sper. Pat. veg., Bologna.

2564. GARAVEL, L.
Enquête sur le comportement du noyer noir d'Amérique en tant que porte-greffe de variétés de noyers indigènes. **(Enquiry into the behaviour of American black walnut as a rootstock for native walnut varieties.)**
Reprinted from *Rev. forest. française*, 1954, No. 4, pp. 217-24, bibl. 5, illus.

The symptoms are described of a gradual degeneration causing death of walnut varieties grafted on *Juglans nigra*. An inquiry into the cause of the relatively short life of these trees has shown that: (1) Ungrafted trees of *Juglans nigra* did not decline; (2) grafted trees died between the ages of 20 and 40 years, generally between 25 and 30 years; (3) degeneration appeared to be independent of environment, scion variety and method of grafting; (4) it was not a contagious disorder; and (5) only the scion died. The degeneration was not due to a fungus and it is suggested that a form of delayed incompatibility may be responsible.

Climatic factors.

(*See also* 2343, 2417, 2443, 2450, 2466, 2582, 2670j.)

2565. DAVIS, M. B., MACARTHUR, M., AND WILLIAMS, D.
Freezing effects on apple wood.
Progr. Rep. hort. Div., centr. exp. Fm, Ottawa, 1949-53, 1955, pp. 131-4, illus.

Three-year-old twigs of *Malus baccata* var. *sibirica maxima* and of Antonovka, Lobo, McIntosh and *Malus robusta* were subjected to controlled freezing experiments. Rapid temperature drop was more injurious than ultimate low temperature, but injury was greater at lower temperatures. Tree health and variety affected resistance to low temperature injury.

2566. AKABANE, N., YAMAZAKI, T., AND SAITO, M.
Frost injury to apple trees. II. Some physiological properties of twigs in relation to resistance to low temperatures. [Japanese, with English summary 13 lines.]
J. hort. Ass. Japan, 1955, **24**: 155-9, bibl. 9.

The moisture content and respiration of 1-year-old shoots of the frost-hardy Dolgo and the less hardy Rall's Janet were studied. The results and conclusions were: (1) The moisture content of the less hardy variety fell more rapidly than that of the hardy in September/November. The moisture contents of both varieties became fairly constant in November. (2) The most resistant tissues were the cambium and the outer bark. (3) Respiration was lower in dormant shoots of the hardy variety. [For Part I see *H.A.*, 25: 1438.]

2567. Rodionov, A. P.
Factors affecting the development of frost resistance in peach seedlings. [Russian.]
Sad i Ogorod, 1955, No. 12, pp. 47-8.

It is suggested that peach seedlings which start growth in the autumn develop into hardier plants than those which begin to grow in the spring. In the Ukraine stratified seeds, seeds vernalized for 50 or 20 days and untreated seeds of the variety Kievskiĭ 1973 were sown on July 21, 1951. Seedlings from the untreated seeds and from seeds vernalized for 20 days gave the highest rate of survival, i.e. 70·6 and 75% respectively, and when grafted on apricot rootstocks they showed a very high degree of frost resistance.

2568. Jones, T. H., and Pickett, B. S.
Observations of winter injury in peaches.
Fruit Var. hort. Dig., 1955, **10**: 45-6.

After severe weather in the winter of 1950–51 damage was assessed in a peach variety trial orchard. The greatest amount of crippling damage was found in crotches of the scaffold limbs. After 4 growing seasons trees of the varieties Dixigem, Shippers Late Red, Rio Oso Gem and Belle of Georgia had the highest percentages of tree deaths.—Knoxville, Tennessee.

2569. Harrison, T. B.
Suspected ice-girdling following the mounding of young peach trees in southwestern Ontario.
Canad. J. agric. Sci., 1956, **36**: 41-4, bibl. 4, illus.

When young peach trees are mounded up in the autumn damage to the bark and cambium often occurs in the trunk at the level of the top of the mound. Surveys made in 2 mounded orchards in 1948 and 1953 showed that more than 28% of the trees suffered moderate to severe injury of this type, some trees failing to survive. The practice of mounding young peach trees is therefore not recommended.—Canad. Dep. Agric., Harrow, Ont.

2570. Overcash, J. P., and Campbell, J. A.
Winter chilling requirements for peaches.
Miss. Fm Res., 1955, **18**(12): 3, illus.

Tests were carried out for 2 years in Mississippi on the chilling requirements of the peach varieties Sunhigh and Redhaven. Continuous chilling at 39° F. caused leaf buds to develop sooner and in greater number after the end of the chilling treatment than intermittent chilling (16 hrs at 39° F. followed by 8 hrs at 70° F. daily), when the same total number of hours of low temperature was given in both cases. Exposure to chilling temperatures for 950 hrs caused more leaf buds to develop than exposure for 750 hrs, regardless of whether chilling was continuous or intermittent. The chilling requirements for flower and leaf bud development of a number of peach varieties are listed.

2571. Ackerman, W. L., Joley, L. E., and Halsey, D. D.
Blossoming and leafing response of foreign and domestic peaches and nectarines to temperature.
Multilith. Rep. Sect. Plant Introd. U.S.D.A., 1955, pp. 29, bibl. 11.

The paper presents in tabular form 4 seasons' data relating to the time of full bloom and the time of first foliation of approximately 900 foreign and domestic variety and seedling peaches and nectarines grown at the U.S. Plant Introduction Garden, Chico, California. Data and discussion of the prevailing weather conditions and of individual and collective reactions to these climatic factors are included. The study has disclosed that the phenological responses of blossoming and leafing of this collection are in general accord with those published by other workers involving more limited plant collections. Different clones vary considerably in heat requirements necessary for blossoming as well as in chilling requirements to break dormancy. [Authors' abstract.]

2572. Lalatta, F.
Prove sulla validità di un metodo per la valutazione comparativa della resistenza dei fruttiferi alla siccità. **(Tests on a method of comparing the drought resistance of fruit plants.)** [English summary ½ p.]
Ann. Sper. agrar., 1956, **10**: 513-37, bibl. 19.

In studies made during 1947/53 on the moisture-retaining capacity of detached leaves the method used was that of Eremeev [see *H.A.*, 10: 963], in which the leaves are weighed at intervals and the percentage weight loss and the proportion of the total number withered are determined. The moisture-retaining capacity: (1) was higher in peach than in apple and much higher than in pear; (2) varied with variety in apple and in vine; (3) was greater in apical leaves than in basal leaves in every species tested. The relationship between the moisture-retaining capacity of the leaves and the drought resistance of the plant is discussed.

Viruses.

(*See also* 2670o, p, t, 2671h, k, n, w, x.)

2573. Posnette, A. F., and Hoblyn, T. N.
Virus-tested rootstocks and scion varieties available at East Malling Research Station.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 151-2.

Varieties expected to be available to Members of East Malling in 1956 and 1957 are listed. They comprise 11 apple varieties, 5 apple rootstocks, 15 cherry varieties and the cherry rootstock F.12/1.

2574. Posnette, A. F., and Cropley, R.
Apple mosaic viruses. Host reactions and strain interference.
J. hort. Sci., 1956, **31**: 119-33, bibl. 18, illus.

Apple mosaic virus occurs in many different strains, and varieties differ markedly in reaction to them. Eighteen rootstock clones and 12 scion varieties were

infected with two or more virus strains. Symptoms of a virulent strain varied from very intense on Lord Lambourne and Allington Pippin to slight on Lane's Prince Albert. M.IX and M.XXV were the most, and M.II and M.XVI the least, sensitive of the stocks tested. Several of the rootstock clones showed no symptoms when infected with a mild strain. In a field trial on mature trees, during the fourth and fifth years after inoculation, a virulent strain reduced the crop of Allington Pippin and Cox's Orange Pippin by 40 and 30% respectively, but had no significant effect on the crop of Worcester Pearmain and Newton Wonder. The growth of young Bramley's Seedling trees in the nursery was reduced more than 20% by a virulent strain. The virus was found to be non-systemic in rapidly-growing shoots, and healthy trees were propagated from buds taken from the tips of such shoots. The virus was inactivated in plants maintained at 37° C. for 27 days. Some plants were permanently cured by this treatment; from others not cured, healthy plants were propagated from buds removed immediately after treatment. Plants already infected with a mild or with an intermediate strain developed no symptoms after inoculation with a virulent strain. The symptoms of three "new types" of mosaic virus and a non-transmissible variegation are described. [Authors' summary.]—E. Malling Res. Stat.

2575. Blumer, S.
Über die Flachästigkeit (Rillenkrankheit) bei Apfelbäumen. **(On flat limb (furrow disease) of apple trees.)**
Schweiz. Z. Obst- u. Weinb., 1956, **65**: 148-53, bibl. 4, illus.

Flat limb frequently occurs on the variety Gravenstein in Switzerland. In Schneiderapfel, an important interstock, the disease starts as local depressions which form grooves later. Scions of Gravenstein, Boskoop, Golden Delicious and Champagner Reinette were grafted on a young tree of Tobiäsler, and about 2½ years later clear symptoms of furrowing were observed on Gravenstein scions. Six months after grafting Gravenstein on a Schneiderapfel stock showing furrowing, the scions showed depressions and, in one case, clear furrowing. It is suggested that in Gravenstein furrowing is an early symptom of flat limb. Anatomical studies of Schneiderapfel have shown that where grooves occur the cambium appears to be no longer functional and few vessels are formed in the xylem tissue, whereas the bast portion is strongly developed. In Gravenstein with flat limb similar internal symptoms were apparent, particularly in the early stages of the disease. A third abnormality of apple trees is spindle-form branch-thickening. This has been observed on Ontario, Kansas Queen and Gravenstein; in the latter variety symptoms were observed in an orchard infected with flat limb. The anatomy of the thickened portion of the branch is similar to that of branches infected with flat limb in that there is an abnormal development of bast and irregular formation of xylem vessels.—Wädenswil.

2576. Millikan, D. F., and Guengerich, H. W.
Transmission to *Amelanchier* of an agent causing a disorder on apple.
Phytopathology, 1956, **46**: 130, bibl. 5, illus.

The disorder in question is associated with combinations of Virginia Crab as an interstock with Golden Delicious and other scion varieties [see *H.A.*, 25: 292, 293, 3689 and 3690]. In Golden Delicious/Virginia Crab combinations the external symptoms are willowy growth in the scaffold branches and vertical lesions in the stem piece. The successful transmission of the agent to *Amelanchier* by budding suggests that *Amelanchier* may be a useful indicator in apple virus studies.—Dep. Hort., Univ. Missouri.

2577. Kunze, L.
Ein Enationenvirus an Sauerkirsche. **(An enation virus of sour cherry.)**
NachrBl. dtsch. PflSchDienst., Braunschweig, 1956, **8**: 58-9, bibl. 4, illus.

A degeneration disease of sour cherries on the Rhine, characterized by enation and described in 1953 [*H.A.*, 23: 3996], was transmitted by grafting to healthy sweet cherries and to seedlings of *Prunus avium* and *P. mahaleb*. The experimental plants responded to infection with leaf discoloration and some of them developed enations. The symptoms of the virus disease transmitted are similar to those of the Stecklenberg disease. [Translation of author's summary.]—Biol. Bundensanst., Berlin-Dahlem.

2578. Nyland, G.
Interference between the viruses or virus strains causing yellow leaf roll and western-X disease of peach.
From abstr. in *Phytopathology*, 1955, **45**: 694-5.

One-year-old Lovell peach seedlings were inoculated concurrently with buds from shoots showing symptoms of peach yellow leaf roll and with buds of shoots with western-X disease, the yellow leaf roll buds being inserted on the main stem above the western-X buds in some cases and below them in others. Only the disease contained in the upper buds appeared in the above-ground portions of the trees.

2579. Cadman, C. H.
Studies on the etiology and mode of spread of Scottish raspberry leaf curl disease.
J. hort. Sci., 1956, **31**: 111-18, bibl. 7, illus.

Scottish raspberry leaf curl disease is shown to be etiologically distinct from the analogous American raspberry leaf curl diseases and to be caused by a number of differing [ringspot] viruses which are sap-transmissible from infected raspberry to a variety of plants including weeds and sugar beet. Similar viruses have been isolated from diseased raspberry plants from England, and all caused local lesions and systemic symptoms on *Hyoscyamus*, *Datura*, *Petunia*, French bean and *Nicotiana* spp. The viruses isolated from raspberry grown in different localities often differed widely. Similar viruses have been isolated from weeds and sugar beet growing near infected raspberries, but none of these has been shown to cause leaf curl. Both raspberry and sugar beet plants became infected at all times of the growing season, raspberry plants sometimes within 5 weeks of planting. Experiments showed that sugar beet and probably raspberries became infected only when their roots were in contact with soil on which ringspot infected plants had grown. An aerial vector of these ringspot

viruses seems improbable and a soil-living vector likely. [Author's summary.]—Scottish hort. Res. Inst., Dundee.

2580. V.D. MEER, F. A. (AND DE FLUITER, H. J.).
Bestrijdingsmogelijkheden van de vector van de dwergziekte van de framboos. (Possibilities of controlling the vector of raspberry stunt.)
Tijdschr. PlZiekt., 1956, **62**: 26.

Control of *Macropsis fuscula* may be obtained by ovicidal applications in January or February, by spring applications of phosphoric acid esters for larval control, and by applications of systemic insecticides or phosphoric acid esters in August/September for control of the adults. In summer spray trials in 1952 fortnightly applications of Systox or parathion resulted in reduced virus infection. Natural infection was found to occur between 1 August and 15 September.—Inst. PlZiekt. Onderz., Wageningen.

2581. FULTON, J. P.
Yearly variations in amount of virus in Arkansas strawberry fields.
From abstr. in *Phytopathology*, 1956, **46**: 12.

Investigations over a period of years suggest that during warm seasons the viruses remain so localized that virus-free runner plants may be produced.

2582. SMEETS, L., AND WASSENAAR, L. M.
Problems of heat spot in *Fragaria vesca* L. when indexing strawberry selections for viruses. [Dutch summary ½ p.]
Euphytica, 1956, **5**: 51-4, bibl. 9, illus.

At a constant temperature of 23° C. indicator plants of *Fragaria vesca* developed heat spot, which has virus-like symptoms. The symptoms became less pronounced at 17° C. and ceased to appear on newly-developed leaves. The plants were therefore transferred to 17° C. after successful unions had been obtained at 23° C.—Inst. hort. Plant Breed., Wagingen.

2583. OCHS, G.
Der heutige Stand der Reisigkrankheits-forschung. **(The present position of "Reisig" disease studies.)**
Angew. Bot., 1955, **29**: 152-9, bibl. 16, illus.

In vines with severe disease symptoms the occurrence of intracellular 'rods' was marked, but in European varieties there was no significant difference in frequency of 'rod' occurrence between healthy plants and those showing only slight symptoms. In the American rootstocks 5 BB and SO4 there was some relationship between frequency of 'rod' occurrence and severity of symptoms. Differences occurred in the organic compounds in sap from diseased and healthy plants, polyphenols being particularly high in diseased sap. Application of growth substances produced symptoms similar to, but not identical with, those of the disease. Mechanical sap transmission resulted in typical virus symptoms in the herbaceous test plants, indicating the presence of 2 [unnamed] viruses which are widespread in many agricultural crops and weeds.—Inst. für Weinbau, Bernkastel.

2584. HARMON, F. N., AND WEINBERGER, J. H.
Foliage burn of vinifera grapes as a symptom of white emperor disease.
Plant Dis. Reptr, 1956, **40**: 300-3, bibl. 4.

In general, fruit colour was much lighter and sugar content much lower in fruiting Emperor vines bud-inoculated from vines showing burned foliage in the autumn than in those not budded or budded from vines with healthy foliage. It was evident that transmission of the white-emperor virus was obtained from all the tested source vines showing burned foliage. No burned-foliage symptoms developed on the index Emperor vines during the first year, showing that fruit was more quickly affected than foliage by the virus.—U.S. Dep. Agric., Fresno, Calif.

Bacteria.

(*See also* 2670g.)

2585. WINTER, H. F., AND YOUNG, H. C.
Temperature as a possible factor in the control of fireblight with streptomycin.
From abstr. in *Phytopathology*, 1956, **46**: 31-2.

Although streptomycin significantly reduced apple blossom blight at Wooster in 1955, the degree of control was low compared with that obtained the 2 previous seasons, owing possibly to the low temperatures prevailing during the critical blossom period in 1955.

2586. MIRZABEKJAN, R. O.
Antibiotics for the internal disinfection of shoots. [Russian.]
Agrobiologija, 1955, No. 2, pp. 130-4, bibl. 3, illus.

Latent infection by apricot wilt, *Bacterium armeniaca*, was arrested by soaking budwood in streptomycin or grizemin [a Soviet product] solutions at 1 : 1,000 for 24 or 48 hours.

2587. GOODMAN, R. N., AND SHEPARD, P.
Indications of *Xanthomonas pruni* control with antibiotic sprays.
Plant Dis. Reptr, 1956, **40**: 93-102, bibl. 3, illus.

In tests in 1955 on 4 peach varieties differing in susceptibility to *Xanthomonas pruni* Agrimycin at 50 or 100 p.p.m. appreciably reduced leaf spotting and defoliation, when spraying began 4 weeks after flowering, when succeeding sprays were applied after extended periods of rain and when the maximum interval between sprays was 7 days.—Miss. St. Fruit Exp. Stat., Mountain Grove.

2588. DAINES, R. H.
Bacterial spot of peach (*Xanthomonas pruni*) and its control by the use of captan and streptomycin.
Plant Dis. Reptr, 1956, **40**: 335-6, bibl. 3.

In tests on Constitution peaches in 1955 captan at 2 lb. per 100 gal. water plus streptomycin at 150 p.p.m. applied every 7–10 days gave the best control, namely 7·5% infected fruits compared with 31·6% in the control. Good control, 9·6% infected fruit, was also given by 4 lb. captan without added streptomycin. Tests showed that streptomycin had penetrated the leaves but not the fruits.—N.J. agric. Exp. Stat., Rutgers Univ.

2589. ARK, P. A., AND CHARLES, F. M.
Control of walnut blight.
Calif. Agric., 1956, **10**(3): 8.

Trials on a small scale have shown that sprays of Copper A or streptomycin considerably reduced walnut blight when applied at the proper time. Application of either a pre-bloom or a post-bloom spray gave only poor control. Satisfactory results, however, were obtained from 1 spray applied at 40% flowering, with or without a second spray after flowering. No effect on pollination was observed. [See also *H.A.*, 26: 1555.]

Fungi.

(*See also* 2417, 2418, 2491, 2498, 2521, 2656-2660, 2662, 2670a, e, m, z, 2671b, e, g.)

2590. Lewis, G. D.
Botryosphaeria canker and fruit rot of apple in New York.
Plant Dis. Reptr, 1956, **40**: 228, bibl. 1.

In New York, where apple canker and fruit rot (*Botryosphaeria ribis*) has recently been found, Rome Beauty, Cortland and Macoun appeared to be highly susceptible to the disease, McIntosh and Rhode Island Greening were less susceptible and Red Delicious, Golden Delicious and Gallia Beauty were tolerant.—Cornell Univ., Ithaca.

2591. Johansson, E.
Pricksjuka-gloeosporiumröta. **(Bitter pit and *Gloeosporium* rot [of apples].)**
Fruktodlaren, 1956, **27**: 61-5, illus.

One year's observations on some 20 apple varieties suggest that the maintenance of a fairly constant soil moisture is an important factor in checking bitter pit; only 6% of Husmoder fruits from trees under straw mulch were affected as against 35% from trees under clean cultivation. Ingrid Marie and varieties of the Cox's Orange family were particularly susceptible to *Gloeosporium* rot. The results of trials with two varieties indicate that foliar applications of N after flowering may reduce infection to some extent. Tabulated data show the effect of spray programmes with several fungicides on the development of the two diseases.—Alnarp.

2592. Edney, K. L.
The rotting of apples by *Gloeosporium perennans* Zeller and Childs.
Ann. appl. Biol., 1956, **44**: 113-28, bibl. 18, illus.

Tree infections of *Gloeosporium perennans* have usually been found to be prevalent in orchards on farms where storage losses of fruit have occurred, and conidia of *G. perennans* have been found on cankers at all seasons during the year. Winter as well as summer pruning cuts have been found to become infected. Detached leaves of Cox's Orange Pippin have been successfully inoculated with *G. perennans* in the laboratory and the fungus has also been found on dead detached leaves in the orchard after picking time. Considerable variations have been found in the susceptibility to rotting of samples of different varieties of apple and samples of Cox's Orange Pippin apples from different orchards. Periodic loading of fruit with spores after picking has shown that resistance declines with length of storage. Wide variation in the time at which rotting begins in commercially stored samples has been observed. A series of inoculations on picked and unpicked immature fruit has shown that the apple loses its resistance to attack on picking. Lenticels which are impermeable to gaseous exchange have been shown to be resistant to penetration by the fungus. Temperature affects the development of lenticel rotting by *G. perennans*, infection being most rapid at about 20° C. Rotting can occur at 0° C. [From author's summary.]—Ditton Lab., D.S.I.R., Kent.

2593. Hunnam, D., Foulds, R. M., and Roney, E.
Controlling *Gloeosporium* rots in stored apples.
Comm. Gr, 1956, No. 3146, pp. 595-7.

In 1954 two August applications of captan reduced *Gloeosporium* infection by as much as 75%, thereby preventing a loss of 10% of the crop stored. A captan scab programme gave better control of *Gloeosporium* than did a sulphur scab programme. Trials in 1955 were conducted in orchards with a high *Gloeosporium* incidence, and captan was sprayed in July–October in addition to captan or sulphur scab programmes. Six additional captan applications greatly reduced *Gloeosporium* infection.—Murphy Chem. Co. Ltd.

2594. Fischer, R.
Beobachtungen, Untersuchungen und Versuche an Apfelmehltau. **(Observations, research and experiments on apple mildew.)**
TätigkBer. Bundesanst. PflSch. Wien, 1951–1955, pp. 212-44, bibl. 13, illus.

Observations have been made of some factors affecting *Podosphaera leucotricha* attack, and the biology of the fungus has been studied. Sulphur spraying for successive years has markedly reduced mildew attack. Mildew on young, non-bearing Jonathans was effectively controlled by 2% lime sulphur sprays.

2595. Storey, I. F., and Ives, J. V.
Spraying practice against apple scab on Bramley's Seedling in the Wisbech area, in 1953 and 1954.
Plant Path., 1956, **5**: 1-8, bibl. 10.

The fungicides used in the orchards surveyed were lime-sulphur, bordeaux mixture, mercurial preparations and captan. A lime-sulphur programme gave poor scab control, and better control was obtained in both years with bordeaux and mercury. Very good control was obtained with captan. In a comparative trial with phenyl mercury nitrate, phenyl mercury acetate and soluble organo-mercury sulphonate very good scab control was obtained with all compounds after 7 applications. Mercurial sprays preceded by bordeaux gave better scab control than those preceded by lime-sulphur. There was no indication that the total number of spray applications affected scab control, but the most marked effect was produced by the number of sprays applied during the effective phase of ascospore activity. There was a marked relationship between the degree of scab control and the timing of the spray application after infection periods. There was some evidence that a mercury spray applied just before the start of conditions suitable for infection had a protective effect. A good degree of scab control was obtained where phenyl mercury nitrate was applied up to 4 days after infection. The mercurial compounds appear to have better eradicant effects than lime-sulphur and bordeaux.—N.A.A.S., Cambridge.

2596. Foschi, S., and Govi, G.
Esperienze comparative di efficacia anti-ticchiolatura eseguite con fitofarmaci acuprici. **(Tests on non-copper fungicides for the control of [apple] scab.)**
Not. Mal. Piante, 1956, No. 35/36, pp. 79-84, illus.

Fifreen fungicides, including Cu, S, Hg, phthalimide, glyoxalidine, dithiocarbamate, TMTD and thiocyanide compounds, were tested against scab on Delicious apples at Bologna in 1955, 8 applications being made between 8 April (bud burst) and 15 July (5th post-blossom treatment). The best 4 were TMTD (2·53% infection compared with 100 for the control), zineb plus copper oxychloride (3·89%), cuprous oxide (5·06%) and bordeaux mixture (5·25%). All the organics gave good protection.—Univ. Bologna.

2597. Jaivenois, A., and Beck, J.
Un essai d'avertissements dans la lutte antiparasitaire. **(Warning tests in plant protection.)**
Rev. Agric. Brux., 1956, **9**: 117-27, illus.

In tests on scab control zineb applied 46 hours after the start of rain during the period of ascospore discharge gave a complete kill of germinating ascospores. The deposit remained active after 41 mm. of rain. It is considered that a warning system would be effective over a wide area around the centre of observations.

2598. Guilliams, C., and Soenen, A.
New ways of controlling scab.
Höfchen-Briefe (English edition), 1955, **8**: 113-49, bibl. in text.

Field trials for scab control on apples were carried out with the following sprays: captan, Pomarsol Z-conc. (4289), Tuzet (4311 forte), wettable sulphur, TMTD, mercury and BaSx (Barium polysulphide). When the sprays were applied 48 hours after the start of ascospore discharge they all gave good results. Mercury preparations, Tuzet (4311 forte), Pomarsol Z-conc. (4289) and sprays of wettable sulphur were still effective when sprayed 3 days after the start of ascospore discharge. Tuzet (4311 forte) also had a favourable effect on foliage and fruit colour, especially in Cox.—Gorsem Res. Sta., Belgium.

2599. Swales, J. E., and Williams, K.
Non-ionic surfactants in concentrate mixtures for the control of apple scab.
Canad. J. agric. Sci., 1956, **36**: 36-40, bibl. 5.

The addition of 2 non-ionic surfactants (Triton B-1956 and Colloidal Spray Modifier) to concentrate fungicidal spray mixtures for the control of apple scab improved the effectiveness of the sprays investigated but increased the amount of spray injury from fungicides which tended to be phytotoxic. [See also *H.A.*, 26: 1556.]—Canada Dep. Agric., Creston and Summerland, B.C.

2600. Taylor, C. F.
Control of black root rot of apple.
From abstr. in *Phytopathology*, 1956, **46**: 29.

Soil treatments were applied and apple trees were planted where trees had died of black root rot in 1942, 1945, 1947 and 1948. Fumigants were injected in 33 holes in a 5-ft. square the summer previous to planting; other materials were applied in the planting hole. Percentage mortality due to *Xylaria mali* per growing season has been as follows: carbon bisulphide, 0·14; formaldehyde, 1·23; bordeaux mixture, 0·85; other materials, 2·75; and untreated, 1·80.

2601. Khan, A. H.
Dematophora root rot.
Bull. Calif. Dep. Agric., 1955, **44**: 167-70, bibl. 7, illus.

In soil sterilization experiments, none of the 22 fungicides used gave economic control of *Dematophora necatrix*. The plum rootstocks Marianna 2623 and 2624, and Myrobalan C, C-7-1, 3J, 29, Gypsie, Stephens and Turner all grew vigorously in infested plots.

2602. Delmas, H.-G.
L'oïdium de l'abricotier en Roussillon. Considérations pratiques. **(Apricot powdery mildew in Roussillon. Practical aspects.)**
Reprinted from *Bull. tech. Inf. Ing. Serv. agric.* **89**, 1954, pp. 7, bibl. 5, illus.

Apricot fruits can be protected against powdery mildew (*Podosphaera oxyacanthae tridactyla*) by 2, or possibly 3, sprays of micronized wettable sulphur (1 kg./hl. of the commercial product containing 80% S). Treatments, made 10–15 days apart, should start at the beginning of April. [See also *H.A.*, 24: 296.] Further treatment for protection of the foliage should be given soon after harvest and again a month later.

2603. Blodgett, E. C., and Twomey, J. A.
Verticillium wilt of orchard trees.
Proc. Wash. St. hort. Ass. 1955, pp. 146-8, bibl. 4.

Symptoms of wilting in apricot, cherry, peach and Stanley prune trees have been caused by *Verticillium albo-atrum* and *V. dahliae*. Soil fumigation before planting is an effective preventive measure, but after planting cultural measures can only relieve the attack.

2604. Berend, I.
Újabb adatok a kajszibarackfak verticillió-zisos pusztulásához. **(New data on the destruction of apricot trees by "verticilliosis".)**
Növénytermelés, 1955, **4**: 285-8, bibl. 11, illus.

Evidence is presented showing that the so-called apoplexy of apricots is caused by *Verticillium albo-atrum*, which is present in many young trees but becomes lethal only when a tree is weakened through some other cause such as frost.

2605. Rui, D., and Cosolo, A. G.
I fungicidi organici sintetici nella difesa del pesco. **(The use of synthetic organic fungicides on peach.)**
Not. Mal. Piante, 1956, No. 35/36, pp. 119-24.

Zineb and captan were tested on an early and a mid-season peach variety in Gorizia in 1953/55, a period generally favourable to fungal diseases. The chief results and conclusions were: (1) Each was more effective against leafcurl (*Taphrina deformans*) and shot-hole (*Clasterosporium carpophilum*), both as a winter and a summer spray, than the standard bordeaux/barium polysulphide treatment. (2) The winter

and summer concentrations for both compounds should be 1·0 and 0·2–0·3% respectively. (3) There should be 3 dormant treatments, namely, just after leaf fall, at bud burst and just before flowering. (4) The addition of a little copper did not increase the efficiency of zineb. (5) The healing of the pruning wounds was more rapid with the non-copper fungicides and was not accompanied by copious exudation of gum.—Osserv. Fitopat., Verona.

2606. Miotto, G.
Prove sperimentali sulla bolla del pesco (*Exoascus deformans*) svolte in provincia di Padova nell'anno 1954/55. (**Trials against peach leaf curl, *Exoascus deformans*, in Padua in 1954/55.**)
Not. Mal. Piante, 1956, No. 35/36, pp. 91-103.

Bordeaux mixture and zineb were tested against *Exoascus* [*Taphrina*] *deformans* on Hale and Lugliatica peaches in 1954/55, a season particularly favourable to leaf curl, treatments being applied in November, December/January and February/March. The chief results and conclusions were: (1) 2% bordeaux gave good control; (2) 0·9% zineb was as effective as bordeaux but 0·6% also gave adequate control; (3) the autumn treatment is essential; the first winter treatment is only necessary in years favourable to infection and on susceptible varieties; the second winter treatment, which is only partially effective, should be replaced by an anti-coccid treatment; (4) Hale and Lugliatica are both susceptible, especially the former.—Ispet. prov. Agric., Padova.

2607. Boubals, D., Agulhon, R., and Vergnes, A.
Essais de lutte contre l'excoriose (*Phoma flaccida* Viala et Ravaz). (**Experiments on the control of excoriosis, *Phoma flaccida*.**)
Progr. agric. vitic., 1956, **145**: 152-7, 169-73, bibl. 3, illus.

In small-scale field experiments in Gard in 1955 spraying with commercial sodium arsenite containing 250 g. active As and 90 g. Na per l. on 10 February at 5·0% and again a month later at 0·5% completely destroyed pycnidia of *Phoma flaccida* on dormant branches of Aramon vines and caused no injury. DNOC was almost as effective.

2608. Pieri, G.
La sperimentazione antiperonosporica a Conegliano nel triennio 1952-1954. (**Experiments on the control of vine downy mildew at Conegliano in 1952/54.**) [English summary ⅓ p.]
Ann. Sper. agrar., 1956, **10**: 555-64.

Copper and non-copper fungicides were tested against downy mildew (*Plasmopara viticola*) on 2 vine varieties. Zineb, captan and nitrobenzene were as effective as 1% bordeaux mixture, and their side-effects, such as leaf yellowing and early defoliation, were overcome by adding a little copper.—Staz. sper. Vitic. Enol. Conegliano.

2609. Ribaldi, M.
Alcune considerazioni sull'impiego di un preparato acuprico organico nella lotta antiperonosporica, in alcune aziende agrarie della provincia di Perugia. (**On the use of an organic copper compound against vine downy mildew in parts of Perugia.**)
Not. Mal. Piante, 1956, No. 35/36, pp. 73-7, bibl. 15.

In parts of Perugia, especially low-lying, humid areas, vines treated with Aspor (zineb) against downy mildew (*Plasmopara viticola*) suffered from early and severe defoliation and an unwonted late attack of powdery mildew (*Uncinula necator*) on the fruit.

2610. Borzini, G.
Osservazioni concernenti l'influenza sulla fisiologia della vite di preparati di zolfo associati a poltiglie a base di etilenbisditiocarbammati di zinco, nella lotta antiperonosporica. (**Observations on the effect on the physiology of vines of applications of sulphur-zineb mixtures against downy mildew.**)
Not. Mal. Piante, 1956, No. 35/36, pp. 113-16.

The chief conclusions drawn from investigations in Piedmont in 1955 on the use of sulphur-zineb mixtures against vine downy mildew (*Plasmopara viticola*) were: (1) When zineb is used instead of copper, thorough treatment against powdery mildew (*Uncinula necator*) is essential; (2) colloidal sulphur and zineb in mixture do not result in the early leaf fall often observed when they are applied separately; and (3) good growth and good control of both mildews can be obtained by adding sulphur to the first zineb sprays only and by applying sulphur alone before and after the series of zineb treatments, which latter should include at least one late application in August against downy mildew.—Lab. sper. Fitopat. Torino.

2611. Zubov, M. F.
Dinitrorodanbenzol for vineyard protection. [Russian.]
Vinodelie i Vinogradarstvo, 1955, No. 8, pp. 35-6.

A 1% suspension of 15% dinitrorodanbenzol with an addition of 8·7% copper oxychloride was as effective against downy mildew as 1% bordeaux mixture. For simultaneous control of other diseases and pests the spray can be used in combination with other chemicals such as DDT, sulphur or thiophos.

2612. Storoženko, E. M.
A compound for the control of downy mildew and white rot on vines. [Russian.]
Vinodelie i Vinogradarstvo, 1955, No. 8, pp. 37-8.

A 1% suspension of dinitrorodanbenzol plus copper oxychloride controlled both downy mildew and white rot as well as, or better than, bordeaux mixture. Dinitrorodanbenzol without copper, used against downy mildew only, was less effective than bordeaux.

2613. Boubals, D., Vergnes, A., and Lelakis, P.
Essais de fongicides organiques dans la lutte contre l'oidium de la vigne effectué en 1955. (Experiments on organic fungicides for the control of vine oidium in 1955.)
Progr. agric. vitic., 1956, **145**: 202-6, 216-22, bibl. 2.

Karathane, a highly refined isoparaffin oil (CS) or volatile sulphur were applied for the control of vine oidium (*Uncinula necator*) in various combinations with bordeaux mixture, captan or zineb used against downy mildew (*Plasmopara viticola*). The results were: (1) Karathane was toxic to oidium but distinctly less so than volatile sulphur; (2) CS had virtually no effect on oidium; and (3) there was no significant difference between bordeaux, captan and zineb in their effect on downy mildew.—École nat. Agric. Montpellier.

2614. Ogawa, J. M., and Vergera, C.
Effects of cycloheximide on powdery mildew of grapes and brown rot of peach fruits in the laboratory.
From abstr. in *Phytopathology*, 1955, **45**: 695.

A 0·5 p.p.m. cycloheximide spray applied to rapidly growing Carignane vine shoots, which were then repeatedly inoculated with powdery mildew (*Uncinula necator*) during 5 weeks, gave virtual freedom from infection, whereas the controls were severely attacked; under similar conditions a 2·0 p.p.m. spray caused slight injury and a 2·5% dust was ineffective. A 100 p.p.m. cycloheximide spray gave excellent protection against the brown rot fungus (*Sclerotinia fructicola*) on cling peach fruits, and in eradicant tests a 50 p.p.m. spray gave complete control on previously inoculated fruits, whereas all the controls developed the disease.

2615. Converse, R. H.
Further evidence of the value of eradicant fungicides for control of pecan scab.
From abstr. in *Phytopathology*, 1956, **46**: 9.

Phenylmercuritriethanol ammonium lactate (PML), sodium pentachlorophenate (PCP) and monocalcium meta arsenite (MMA) were used in field tests against pecan scab (*Cladosporium effusum*) in 1955. Conidial production on over-wintered lesions following 2 eradicant sprays in March of trees and of the ground beneath them was reduced by May to 0–3% of the levels in the unsprayed controls. By August, unsprayed nuts averaged 88·7 lesions per shuck. Trees given 2 MMA sprays averaged 5·9 lesions per shuck, and trees given 4 ziram protectant sprays averaged 2·5. Nuts from trees sprayed with ziram and MMA, 0·6; those with ziram and PCP, 0·3; and those with ziram and MMA (where, in addition, the surrounding ground was sprayed with MMA), 0·01. No phytotoxicity was observed.

2616. Foott, J. H., Hendrickson, A. H., and Wilson, E. E.
Walnut branch wilt.
Calif. Agric., 1955, **9**(10): 11.

Branch wilt (caused by *Hendersonula toruloidea*) in walnuts may be reduced by removing all diseased branches from the tree each year, by soil applications of nitrogen and by providing adequate soil moisture throughout the growing season.

Nematodes.

(*See also* 2410, 2561, 2670x, 2671m, q, 2856.)

2617. Potter, H. S., and Morgan, O. D.
Nemagon control of root-knot nematode on strawberries.
Plant Dis. Reptr, 1956, **40**: 187-9, illus.

Nemagon [1,2-dibromo-3-chloropropane], when used either in liquid form at 0·4 and 0·8 gal. per acre or in dry form at 140 and 280 lb. of a 5% material per acre, gave good control of root-knot, *Meloidogyne hapla*, on strawberries, variety Stelemaster. Both types of material were applied as the plants were side-dressed with fertilizer. No phytotoxic effects were noted. [From authors' abstract.]—Univ. Md agric. Exp. Stat., College Park.

2618. Lear, B., and Raski, D. J.
Survival of root-knot nematodes in grape and tomato roots recovered from soils fumigated with Nemagon.
From abstr. in *Phytopathology*, 1956, **46**: 18.

Data from greenhouse and field experiments indicate that Nemagon at rates up to 10 gal./acre does not penetrate non-rotted tomato or grape roots in amounts lethal to root-knot nematodes (*Meloidogyne incognita* var. *acrita*). At 20 gal./acre Nemagon penetrated tomato roots but injured the plants.

Mites.

(*See also* 2521, 2670i, k, s, v, 2671d.)

2619. Lord, F. T.
The influence of spray programs on the fauna of apple orchards in Nova Scotia. IX. Studies on means of altering predator populations.
Canad. Ent., 1956, **88**: 129-37, bibl. 4.

DDT was used in varying concentrations and at several periods in the growing season to disrupt the relationships between mites and their predators in a series of apple plots. Concentration and time of application determined time and magnitude of the peaks of population attained by the mites, the re-establishment of predator populations, and the time elapsing until an equilibrium of low populations of predators and mites was again attained. Pre-blossom treatments, particularly at the lower dosages, caused less disturbance than later treatments, and there was little continuance of the effects into the second year. DDT applied after blossom caused great destruction of predators and rapid increases in mite numbers; re-establishment of predators began in late summer and continued well into the second year. Large numbers of winter eggs of mites were found after late summer applications of DDT, and as a result mite populations in these plots reached high peaks during the second year but began to decline in late summer as the predators re-established themselves. *Anthocoris musculus* was the most prominent predator, and was fairly tolerant of DDT. Other predators found showed little tolerance of DDT.—Sci. Serv. Lab., Kentville, N.S.

2620. Anon.
New spray promises less trouble with mites.
Amer. Fruit Gr, 1956, **76**(5): 34-5.

Kelthane, a promising new acaricide, is a chlorinated

compound available as a wettable powder, an emulsion concentrate or a dust. Application is recommended during the early part of the season, and should not be made later than 3 weeks after petal fall to avoid residues at harvest. A report from the New York State Agricultural Experiment Station stated that excellent control of European red, two-spotted and clover mites was obtained by Kelthane. Significant control of mites was obtained in Delaware, and results from Ohio were promising. In Washington State some injury to Jonathan has been reported. No mite resistance to Kelthane has yet been observed.

2621. Tew, R. P., and Gambrill, R. G.
The fruit tree red spider mite, *Metatetranychus ulmi* (Koch): a further pilot trial in the field of two ovicides applied to apples at pink bud.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 149-50, bibl. 2.

Two established summer ovicides, chlorfenson [4-chlorphenyl 4-chlorbenzenesulphonate or CPCBS] and chlorbenside [4-chlorphenyl 4-chlorbenzyl sulphide], have been compared on apple trees in the field as pink-bud treatments for the control of the fruit tree red spider mite up to the stage when the hatch of winter eggs was complete. Both chemicals proved effective, but there were significantly fewer summer eggs where chlorbenside treatments had been applied. [Authors' summary.]

2622. Glauco, R., and Antonio, R. P.
Prima serie di esperimenti effettuati in Italia con un preparato a base di *p*. clorobenzil-*p*. clorofensil solfuro contro il ragno rosso. **(First series of trials in Italy on *p*-chlorbenzyl *p*-chlorphenyl sulphide against red spider.)** [English and French summaries 11 lines each.]
Boll. Zool. agrar. Bachic., 1954, **20**: 175-92, bibl. 1.

In tests on several apple and pear varieties in the Cremona and Brescia districts in 1954 chlorocide (*p*-chlorbenzyl *p*-chlorphenyl sulphide), either as a wettable powder at 100 g. or as a miscible oil at 60 c.c. per hl. water, gave control of *Metatetranychus ulmi* for 60 days if applied in June/July or for 40 days if applied at the end of August. It is considered that it should be applied monthly. Applied in June/July it was about twice as effective as chlorinated phenyl benzene sulphonate. Mixing it with lead arsenate or bordeaux mixture did not impair its efficiency.

2623. Grandori, R., and Rota, P.
Esperimenti di lotta contro *Metatetranychus ulmi* con il prodotto R.6199. **(Experiments on the control of *Metatetranychus ulmi* with R.6199.)** [English and French summaries 17 and 13 lines.]
Boll. Zool. agrar. Bachic., 1955, **21**: 53-68, illus.

In experiments in the Brescia and Portomaggiore districts in July/October 1954 on Delicious and Abbondanza apples R.6199 gave virtually complete control of *Metatetranychus ulmi*. Two applications at 27·5 p.p.m. at an interval of a week are recommended. A single application at the end of June had a residual effect lasting 2½ months.

2624. Urchs, H.
Spritzversuche mit Metasystox und Ovotoxon gegen Obstbaumspinnmilben (*Paratetranychus pilosus* Can. und Franz.). **(Spray trials with Metasystox and Ovotoxon against fruit tree red spider.)** [English, French and Spanish summaries 3 or 4 lines each.]
Mitt. Klosterneuburg, Ser. B, 1956, **6**: 74-6.

Two sprays of Metasystox or Ovotoxon applied before or after flowering gave good control of red spider mites on apple trees. Post-bloom sprays are recommended in orchards where flowering starts at different times.

2625. Madsen, H. F.
Red mite on pears.
Calif. Agric., 1956, **10**(2): 8, 12, illus.

In trials on Anjou pears pre-blossom sprays of FW-293, Sulphenone and Karathane were not effective in controlling European red mite [*Metatetranychus ulmi*]. Systox kept the mites in check until June. Genite-923 and Mitox controlled the mites until July. Compound 1303 showed considerable promise and prevented a build-up of mites before July. Genite-923, at 1½ pints of 50% emulsion per 100 gal., was considered to be the most suitable material, so far, for commercial use. [For earlier work see *H.A.*, 25: 2674.]

2626. Davis, D. W.
Spray fruit trees early for brown mites.
Fm and Home Sci., 1955, **16**: 76-7, 82, illus.

Tests were conducted in Utah in 1954 and 1955 to find the best method of controlling brown or clover mite, *Bryobia praetiosa*, on peaches and apples. Systox proved to be the most effective material when applied either as a delayed dormant spray on peaches or as a summer spray on apples. Very good results were also obtained on peaches with delayed dormant sprays of lime-sulphur, lime-sulphur plus dormant oil, Ovotran 50% or Genite 923, all of which controlled the mite for the entire season.

2627. Anthon, E. W.
Two pests of stone fruits.
Proc. Wash. St. hort. Ass. 1955, pp. 58-9, bibl. 1.

Cherry rust mite control has been obtained by late delayed dormant sprays, notably with demeton, by pre-harvest dusts of Aramite, or by post-harvest sprays of which sulphur was the most effective. Peach fruit injury by sucking bugs was greatly reduced by sprays at the pre-pink or shuck stage. Sprays of DDT plus parathion have given excellent control, though 2 applications may be necessary.

2628. Foschi, S., and Tamburini, R.
L'acaro giallo della vite *Tetranychus telarius* L. **(The vine red spider mite, *Tetranychus telarius*.)**
Ital. agric., 1955, **92**: 851-61, bibl. 7, illus.

Tests on Montuni vines at Bologna in 1954 showed that effective control of *Tetranychus telarius* can be obtained by: (1) A winter treatment with calcium polysulphide at 7 Bé about the end of March; and (2) two summer treatments, in mid-June and mid-August, either with an organic sulphur acaricide such

as Ovotran or Murvesco plus a phosphoric ester, or with Aramite plus Murvesco.

Insect pests.

(*See also* 2513, 2670c, d, h, l, u, w, y, 2671c, f, j, o, p, r, s, v, y, 3194.)

2629. Hough, W. S.
Aphid control in apple orchards after the dormant season.
Bull. Va agric. Exp. Stat. **471**, 1955, pp. 16, bibl. 1, illus.

Effective control of the rosy apple aphid (*Anuraphis roseus*) was obtained by a pre-blossom spray of parathion, malathion or TEPP. BHC gave adequate control when the temperature at the time of spraying or during the following day was near or above the middle 60's. Parathion, malathion and TEPP were also effective in a petal-fall spray, although considerable aphid damage occurred when spraying was delayed by a week after petal-fall. Kill of rosy apple aphids in curled leaves during May was lower if the temperature at spraying was in the mid-50's than if it was in the mid-70's. Parathion gave the most effective control of rosy apple aphids in curled leaves under all temperature conditions. The green apple aphid (*Aphis pomi*) was controlled by sprays of parathion, malathion, TEPP or nicotine sulphate.

2630. Glass, E. H., and Chapman, P. J.
Summer control of the apple aphid.
J. econ. Ent., 1955, **48**: 695-7, bibl. 2.

Twenty insecticides were tested for summer control of apple aphid, *Aphis pomi*, in 1952, 1953 and 1954. Most materials, while quite toxic, had little or no residual activity and aphid populations resumed development a few days after treatment. Some systemic insecticides however, were very effective in both immediate kill and residual action, preventing reinfestation for a period of up to 3 weeks. Of these Demeton, Meta-systox, Isolan and G-22870 appeared to be the best.—N.Y. St. agric. Exp. Stat., Geneva.

2631. Madsen, H. F., and Hoyt, S. C.
Woolly apple aphid control.
Calif. Agric., 1956, **10**(3): 6, 14.

Ryania, 2 systemic phosphates and 3 non-systemic phosphate compounds were tested for the control of woolly apple aphid on Newtown Pippins. Ryania was considerably less effective than the other materials in controlling aphid migration. Excellent control was obtained with compounds 12008, 3911 and Diazinon, and commercial control with compounds 17147 and 1303.

2632. Michelbacher, A. E., and Oatman, E.
Walnut aphid studies in 1955.
Calif. Agric., 1956, **10**(3): 9-10, 14, illus.

Aphid infestations were very severe in parts of California in 1955. The early infestations had little effect on soundness of crop or lightness of meat colour, but there was a marked reduction in size and weight of meats. Set was apparently unaffected. The best meat size and weight was obtained on OMPA-treated plots. OMPA was the most successful acaricide used, but it cannot yet be recommended for commercial use.

2633. Michelbacher, A. E., and Oatman, E.
Marked suppressing action of schradan on the walnut aphid.
J. econ. Ent., 1955, **48**: 768-9.

In California schradan incorporated in the codling moth spray and applied at 1·5, 2·0 and 2·5 lb. per acre in 200 gal. gave outstanding control of walnut aphid, *Chromaphis juglandicola* [see also *H.A.*, 26: 1595]. Single treatments resulted in excellent aphid suppression for a full year and in addition exerted a residual controlling action against the crawlers of frosted scale, *Lecanium pruinosum*. They were also effective against Pacific spider mite, *Tetranychus pacificus*, but not European red mite, *Metatetranychus ulmi*.—Univ. Calif., Berkeley.

2634. Pieri, G.
Intorno all'azione ovicida di alcuni olii minerali gialli nei confronti dell'uovo d'inverno della fillossera. **(Investigation on the effect of some yellow mineral oils on the winter eggs of phylloxera.)**
Riv. Vitic. Enol., 1956, **9**: 35-8, bibl. 10, illus.

In tests on Rupestris du Lot in Treviso 2 types of yellow oil and Dytrol (yellow oil plus DNOC) each delayed the appearance of phylloxera galls by about a month, Dytrol being slightly better than the unfortified oils. Before treatment, which took place a few days before bud break, the bases of the vines were uncovered and part of the bark scraped off.

2635. Chrestian, P.
Le capnode noir des Rosacées. **(The black flat-headed borer of Rosaceae.)**
Trav. orig. Serv. Déf. Vég., Rabat **6**, 1955, pp. 141, bibl. 158, illus.

The biology and life history of *Capnodis tenebrionis* are fully described. Hand collection has been the most successful control method for adults. A successful preventive measure against very young larvae consists of spraying or dusting the soil around the tree trunk with BHC or dieldrin, the treatment being repeated after 60 days. Original sources of infection were destroyed by treatment with dieldrin, chlordane or lead arsenate against adults, and with dieldrin or BHC against larvae. [For earlier report see *H.A.*, 25: 366.]

2636. Grandori, R., and Rota, P.
Esperimenti di lotta con aldrin contro elateridi e maggiolino. **(Experiments with aldrin against elaterids and cockchafers.)** [English and French summaries 14 lines each.]
Boll. Zool. agrar. Bachic., 1954, **20**: 3-26, bibl. 6, illus.

In tests near Como on vine cuttings and nursery conifers 1 kg. 2·5% aldrin dust incorporated with the soil between the rows to a depth of 10–15 cm. in spring gave good control of white grubs (*Melolontha melolontha*) and had 6 months' residual effect.

2637. Hering, M.
Der Gefurchte Dickmaulrüssler als Rebschädling. **(Vine weevil.)**
Flugbl. biol. Bundesanst. für Land- u. Forstw. **77**, 1955, pp. 6, illus.

The life-history of and symptoms caused by *Otiorrhynchus sulcatus* are described. By dusting the vines

and stakes with DDT or phosphoric acid esters adult attack is largely prevented. Indirect control may be obtained by using only well-rotted forest soil for top-dressing, by sterilizing virgin soil with CS_2, and by not using farmyard manure in which the weevils like to pupate.—Inst. Weinb., Bernkastel.

2638. Delmas, H. G.
Le vespère de la vigne. (**The longicorn beetle of vines.**)
Reprinted from *Rev. Zool. agric.*, 1954, No. 7-9, pp. 12, bibl. 5, illus.
Tests in 3 regions have shown that *Vesperus xatarti* may be controlled by soil treatments with BHC dust at a rate of 20 kg./ha. Parathion at 5 kg. active ingredient per ha. also gave good results.

2639. Roediger, H.
Zur Biologie und Bekämpfung des Ungleichen Holzbohrers (*Xyleborus dispar* F.). (**Biology and control of the shot-hole borer.**)
NachrBl. dtsch. PflSchDienst., Braunschweig, 1956, **8**: 36-40, bibl. 10, illus.
The flight of *Xyleborus dispar*, a pest of apples, damsons, cherries and pears, was shown to depend on temperature, and only rarely occurred below 20° C. After testing several oil-containing insecticides, those containing diesel oil, and a lindane/summer oil mixture were found to be most effective against the boring female, but varied in their effects against the larvae.

2640. Chandler, S. C.
Control of peach catfacing insects in Illinois.
J. econ. Ent., 1955, **48**: 635-8, bibl. 9.
During earlier experimental work it was established that plum curculio, *Conotrachelus nenuphar*, tarnished plant bug, *Lygus lineolaris*, and several stink bugs were responsible for most of the catfacing injury on peaches. Recent cage tests showed that tarnished plant bugs and stink bugs can be killed by dieldrin, DDT or parathion, either by spraying the insects or by the insects coming in contact with sprayed foliage and fruit. The persistence of the materials was in the order named. Large scale orchard tests showed the value of early application of the insecticides starting with treatments in the pink stage. Of the 2 insecticides, dieldrin and parathion, which control both plum curculio and the sucking insects, dieldrin is the better both as a spray and as a dust. Bees did not appear to be affected by dieldrin.

2641. Lizer y Trelles, C. A., and Vergani, A. R.
Comportamiento del amoníaco como cebo atractivo de la mosca de los frutos (*Ceratitis capitata*). (**Ammonia as a bait for the Mediterranean fruit fly, *Ceratitis capitata*.**)
[English summary 9 lines.]
Rev. Agron. B. Aires, 1954 (issued 1955), **13**: 439-46.
Traps, baited with 2% commercial ammonia or 25% wine vinegar and exposed for 15 months in deciduous and citrus orchards, caught 77 and 269 fruit flies respectively, the percentages of females being 76 and 66 respectively.

2642. Smit, B.
Control of fruit flies.
Fmg S. Afr., 1956, **31**: 29-30.
Fruit flies infesting stone fruits in South Africa are *Ceratitis capitata* and *Pterandrus rosa*. Infested fruit should be put in water with a little paraffin to kill larvae and puparia. A bait of sugar, parathion and water to control the flies has been used with success. A new poison for flies, Compound No. 4490 (known in America as No. L. 1359) has also shown promise.

2643. de Pietri-Tonelli, P.
Contro la mosca delle ciliege nuovi insetticidi di sicura efficacia. (**New insecticides of assured efficacy against the cherry fruit fly.**)
Ital. agric., 1956, **93**: 49-56, bibl. 1, illus.
An account is given of experiments in 1955 on the control of *Rhagoletis cerasi* on 2 bigarreau varieties with the N-monomethylamide and the N-monoisopropylamide of 0,0-dimethyldithiophosphorylacetic acid and the N-monoisopropylamide of 0,0-diethyldithiophosphorylacetic acid. A single application of any of the 3 products as a spray at 0·15–0·60‰ or as a 3% dust made when the first egg-laying punctures were observed on the fruit in mid-June resulted in a 100% kill of the larvae in the flesh within 3–4 days. The flavour of the mature cherries was not affected by the treatments and toxic residues were less than 1 p.p.m. —Lab. sper. agrar. Soc. Montecatini, Signa.

2644. Kriegler, P. J.
The integration of chemical control with biological control of the mealy bug in vines.
Dec. Fruit Gr, 1955, **5**: 263-4, illus.
Successful biological control of mealybug on vine is possible provided that control of Argentine ant is effective. Soil dressings with dieldrin and chlordane have given outstanding results against the ants [see *H.A.*, 25: 3767]. Some chemical control may be necessary on individual vines when mealybug build-ups occur. Parathion sprays applied in the summer have given the best control.—West. Prov. Fruit Res. Stat. Stellenbosch.

2645. Hough, W. S., and Hill, C. H.
The role of some substitutes for lead arsenate or DDT in the apple spray program.
Bull. Va agric. Exp. Stat. **467**, 1954, pp. 18, bibl. 4, illus.
In orchard trials no single insecticide as used in the petal-fall and early cover sprays and then followed by DDT for the remainder of the season gave consistently satisfactory control of codling moth, red-banded leaf roller and plum curculio. In laboratory tests parathion was among the most effective insecticides used against codling moth and its larvae and was also the only material exhibiting ovicidal properties of practical importance against codling moth eggs.

2646. Tew, R. P., and Groves, J. R.
Some field experiments upon the control of codling moth, *Enarmonia pomonella* (L.), by organic insecticides.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 146-8, bibl. 7.
In field trials during two years [1951 and 1952], in which single applications of lead arsenate, four

chlorinated hydrocarbons (aldrin, dieldrin toxaphene and DDT) and a general-purpose pesticide 2-(1-methylheptyl)-4:6-dinitrophenyl crotonate (DNOPC) were compared, only DDT significantly reduced damage due to codling moth larvae. In the 1951 trial DNOPC exhibited characteristic acaricidal action as regards the fruit tree red spider mite [*Metatetranychus ulmi*]. In the 1952 trial all three chemicals tested (lead arsenate, toxaphene and especially DDT) were associated with increased populations of this mite. [Authors' summary.]

2647. Michelbacher, A. E., and Oatman, E.
Codling moth on walnuts in '55.
Calif. Agric., 1956, **10**(2): 10, 15.

Applications of a lead arsenate/DDT mixture or DDT alone by a conventional sprayer were somewhat more effective in controlling nut infestation than applications by an air carrier sprayer. In a single plot, which had already received a DDT spray in May, the air carrier sprayer was used in mid-June to apply a standard lead arsenate spray. Infestation was only reduced from 3·2% to 2% by this second spray. The application of a single DDT spray at the beginning of May reduced infestation from 2·5% to an average of 0·75% for 3 plots.

2648. Uitterlinden, L.
Waarnemingen en proeven ter bestrijding van voorjaarsuilen. **(Observations and experiments in the control of clouded drab moths.)**
Fruitteelt, 1956, **46**: 188-9, 194, illus.

The moths (*Orthosia* spp.) were attracted by a light trap. Flying and oviposition by *O. incerta* and *O. gothica* took place at fairly low temperatures. The young larvae were controlled by DDT, parathion and endrin; lead arsenate was less satisfactory.

2649. Baggiolini, M.
Contribution à l'étude d'une lutte rationnelle contre la tordeuse *Cacoecia rosana* L. **(Contribution to the study of the control of the tortrix, *Cacoecia rosana*.)**
Rev. romande Agric. Vitic., 1956, **12**: 21-4, bibl. 6, illus.

The biology, natural enemies and chemical control of *Cacoecia rosana* are discussed. Experiments with a number of insecticides showed that effective control can be obtained by applying parathion or diazinon at 0·1% at the time of the second pre-blossom spray, at which stage hatching is practically complete.

2650. Missonnier, J.
Biologie des psylles du poirier. Méthodes de lutte. **(Biology of pear psylla and methods of control.)**
Congr. pomol. int., Paris, 1955, 1956, pp. 167-79, bibl. 19, illus.
Bonnemaison, L., and Missonnier, J.
Le psylle du poirier (*Psylla pyri* L.). Morphologie et biologie. Méthodes de lutte. **(The pear psylla. Morphology and biology; methods of control.)**
Ann. Épiphyt., 1956, **7**: 263-331, bibl. 83, illus.

Of the three species of *Psylla* infesting pears *P. pyri* is the commonest in the Paris region where it causes severe losses. Its biology is discussed in detail. Many of the modern insecticides were found to be effective against eggs, larvae and adults, applications in spring (end of April or beginning of May) having proved most successful. Further treatments in the autumn after picking with BHC or parathion and in winter with yellow oil plus parathion are recommended in cases of very heavy infestation.—Stat. centr. Zool. agric., Versailles.

2651. Michelbacher, A. E., and Hitchcock, S.
Frosted scale on walnuts.
Calif. Agric., 1956, **10**(4): 11, 14-15, illus.

Mass frosted scale outbreaks occurred on walnuts in California after DDT 50% wettable powder had been used for codling moth control at rates above 5 lb. per acre. OMPA gave effective scale control on twigs, petioles and leaves when incorporated with the May DDT spray. Parathion applied in May also controlled scale.

2652. Tippins, H. H., and Hyche, L. L.
Control of flower thrips on blackberries.
J. econ. Ent., 1955, **48**: 769-70, bibl. 2.

In Alabama 1 and 2 applications of parathion at 1 pt. or malathion at 1·5 pt. per 100 gal. gave highly significant control of thrips, *Frankliniella tritici* on blackberries (Youngberry). Insecticidal residues on berries picked 4 days after the second application did not exceed 0·5 p.p.m.

Other pests.

(*See also* 2670f, r, 2671a, i, 2757, 3093, 3119n.)

2653. Low, J. B.
Control deer damages.
Fm and Home Sci., 1955, **16**: 78-82, illus.

Information is given on deer damage prevention by 7 methods. With the exception of chemical repellents, they are all mechanical methods and include frightening devices, fencing, wrapping trees, herding and shooting. Of the repellents tested 3 commercial products, namely Goodrite Z.I.P. containing 30% zinc dithiocarbonate-amine complex and 10% polyethylene polysulphide, Diamond "L" brand deer repellent and 12% BHC, were found to be the most promising.

2654. Reich, H.
Verfahren und Versuche zur Bekämpfung und Abwehr der Nagetiere. **(Methods and experiments in rodent control and protection.)**
Mitt. ObstbVersuchsringes Jork, 1956, **11**: 9-16, bibl. 9.

A summary is given of the damage caused by and some control methods used against musk rats, hares, field mice and water rats. Trunk coatings have been used with some effect to protect trees from hares, but the substances used weather rather quickly. Ground sprays of toxaphene have been effective against field mice. Water rats are difficult to control; hydrogen phosphide gas has been used, but with little effect.

2655. Faulkner, C.
Mouse control with new trail making machine.
Proc. 100th annu. Mtg N.Y. St. hort. Soc., 1955, pp. 48-9.

The machine makes an artificial trail 1½ in. in diameter and 3 in. deep under the drip line of the trees. [See also *H.A.*, 24: 353.] The slit along the surface of the ground remains open to allow mice on the surface trails to drop down into the artificial runway in which apple baits treated with zinc phosphide rodenticide are placed every 5 ft. The trail builder achieves almost 100% control of meadow mice and about 80% control of pine mice. The machine will not make a satisfactory trail in freshly cultivated soil or under a heavy mulch.

Spray materials and residues.

(*See also* 2670b, n, 2671 l, t, u, 2781, 2864 l, 2865h, 2866q, 2902, 2940, 3119e, 3203.)

2656. Byrde, R. J. W., and Woodcock, D.
Fungicidal activity and chemical constitution. III. Pentachlorophenol derivatives.
Ann. appl. Biol., 1956, **44**: 138-44, bibl. 17.

Nine derivatives of pentachlorophenol were prepared and tested for fungistatic activity against the mycelia of *Botrytis fabae*, *Sclerotinia laxa* and *Stereum purpureum* and for phytotoxicity towards tomato, apple and plum. The most fungitoxic of these compounds was the acetyl ester, but its phytotoxicity precludes its use as an eradicant fungicide on foliage.—Long Ashton Res. Stat.

2657. Wilson, E. E., and Ogawa, J. M.
New materials as eradicant fungicides.
From abstr. in *Phytopathology*, 1956, **46**: 31.

When applied as sprays to dormant almond trees, proprietary formulations of dinitro-*o*-*sec*-amylphenol (DNAP) and of a 1 : 4 mixture of DNAP and 2-*sec*-butyl-4,6-dinitrophenol (DNBP) compared favourably with sodium pentachlorophenate (SPP) in eliminating the conidial inoculum of *Sclerotinia laxa* from hold-over sources. Reduction in the amount of blossom infection following use of these materials ranged from 73 to 82%. The percentage reduction in fruit infection by *Coryneum beijerinckii* was 71 for SPP, 59 for DNAP, and 94 for a proprietary formulation of N-phenylmercuriethylenediamine (PMED). The percentage reduction in fruit infection by the almond scab fungus (presumably *Cladosporium carpophilum*) was 34 for SPP, 20 for DNAP and 60 for PMED.

2658. Rijsten, E. G.
Ervaringen met enkele nieuwe fungiciden (Voronit, Tuzet). (**Experience with some new fungicides (Voronit, Tuzet).**)
Tijdschr. PlZiekt., 1956, **62**: 26-7.

Voronit is an organic, non-metallic compound (chinonoximbenzoylhydrazon) used for pea and bean seed protection. In glasshouse and field tests Voronit gave better results than TMTD. Tuzet is a combination of TMTD, ziram and Urbacide (arsenic carbamate), and has been used successfully against scab. Fruit colour was improved. It is recommended for use on apples and pears but not on stone fruits.—N.V. Agro. Chemie.

2659. Vörös, J.
A trichothecin antibiotikum alkalmazása növényi kórokozók ellen. (**The use of the antibiotic trichothecin against plant diseases.**)
[English and Russian summaries ¾ p. each.]
Növénytermelés, 1955, **4**: 233-40, bibl. 10, illus.

Trichothecin, produced from the fungus *Trichothecium roseum* was tested on a variety of crops. Experiments on the control of melon rot (*Colletotrichum lagenarium*) showed that 1·0 U/ml. of trichothecin inhibited the growth of the pathogen *in vitro*, but on glasshouse-grown, artificially-infected melon seedlings the antibiotic gave no control. Applications of trichothecin to melon seeds in concentrations up to 50 U/ml. stimulated germination. Against *Monilia laxa* on sour cherries, partial control was obtained by spraying into the flowers with 25 U/ml. concentration, and complete control by spraying with 50 U/ml. concentration.—Res. Inst. Plant Protection, Budapest.

2660. Scaramuzzi, G.
Prove con anticrittogamici acuprici in Puglia. (**Trials on non-copper fungicides in Apulia.**)
Not. Mal. Piante, 1956, No. 35/36, pp. 85-90, bibl. 1.

The results of trials on various crops in 1955 are given: (1) In some Apulian vineyards non-copper fungicides, mainly Aspor (80% zineb), caused early defoliation, especially on low-trained vines, when used against downy mildew (*Plasmopara viticola*) but in others they gave at least as good results as bordeaux mixture. (2) Three fortnightly applications of 0·2–0·3% Aspor beginning on 24 April gave almost complete control of *Clasterosporium* on almonds and peaches under conditions of severe attack. (3) Two applications of 0·2–0·3% Aspor a fortnight apart gave satisfactory control of sooty mould on olives and were slightly better than 1% bordeaux. (4) A single, late application of 2·5% karathane at the beginning of September gave excellent control of powdery mildew (*Erysiphe cichoracearum*) on tobacco and apparently left no deposit that might affect quality.—Lab. crit., Pavia.

2661. Fontana, P., Martelli, R., and Casarini, B.
Traslocazione dell'etilenbisditiocarbamato di zinco. (**Translocation of zinc ethylene bisdithiocarbamate.**)
Not. Mal. Piante, 1956, No. 35/36, pp. 67-70, bibl. 3.

In experiments on Barbera vines in 1954 and 1955 zineb whether applied alone or with Ca, Cu or Prussian blue, was not translocated in significant amounts. Leaf concentrations did not exceed 0·032 mg. per g. leaf tissue.—Univ. cattol. S. Cuore, Piacenza.

2662. Casarini, B., and Pucci, E.
Prove sulla durata dell'efficacia fungicida dell'Aspor irrorato su vetrini e su piante in serra. (**Tests on the residual effect of Aspor sprayed on slides and on greenhouse plants.**)
Not. Mal. Piante, 1956, No. 35/36, p. 37, bibl. 1.

Aspor (zineb) soon lost its efficacy in laboratory tests, but it had a satisfactory residual effect of 3 weeks in greenhouse tests on treated vines repeatedly inoculated

with *Plasmopara viticola* and maintained at 95–99% R.H. for 12 hours out of every 48 (i.e. for 3 nights a week).—Ist. Pat. veg. Univ. Bologna.

2663. Rich, A. E., and Bilbruck, J. D.
The effect of various fungicides on apple pollination and fruit set.
From abstr. in *Phytopathology*, 1956, **46**: 24.

In field tests in north-eastern U.S.A. captan, glyodin, ferbam and dichlone, used for the control of apple scab, did not adversely affect pollination or fruit set.

2664. Schmidt, T.
Untersuchungen über die Beeinflussung der Pollenkeimung durch Spritzung in die Blüte und ihre Auswirkung in der Praxis. **(The effect of blossom sprays on pollen germination and its practical significance.)**
[English summary 13 lines.]
PflSch. Ber. Wien, 1956, **16**: 75-9, bibl. 4.

Certain fungicides, especially thiuram and captan, caused a reduction in the germination percentage of apple, pear and plum pollen when sprayed into the open blossom. Of the insecticides tested only Systox adversely affected pollination by injuring both pollen and stigmas. None of the effects observed, however, caused any reduction in yield.

2665. Gyrisco, G. G., and others.
Further studies on the effects of soil treatments with insecticides on residues and fruit quality of strawberries.
J. econ. Ent., 1955, **48**: 700-3, bibl. 5.

In New York a gravelly loam soil was treated with 1, 2 and 4 lb. per acre of aldrin, dieldrin, lindane and heptachlor dusts just before planting. When in the following 2 years the quality of fresh-frozen fruit and jam was judged the colour of all samples was found to be satisfactory, and the flavour was only affected in jam prepared from fruit grown on the aldrin-treated plots. Chemical analysis and bioassay of the fresh-frozen fruit disclosed no residues that equalled or exceeded 0·1 p.p.m. [For an earlier report see *H.A.*, 25: 1546.]

2666. Hiroyasu, T., and Masuda, S.
Parathion spray residues on grapes.
[Japanese, with English summary 15 lines.]
J. hort. Ass. Japan, 1955, **24**: 165-7, bibl. 11.

Investigations on grapes and must gave the following results: (1) The residue on grapes, which was found almost entirely on the skin, fell from 1·54–3·64 mg./kg. immediately after spraying to 0·75–1·55 mg. 5 days later and to a trace 20 days after spraying, even in the absence of rain. (2) Of 5·21 mg. of the chemical added to each l. of must before fermentation 1·5 mg. remained after 70 days but only a trace after 140 days. The colour and flavour of the wine were not affected.

Apparatus and technique.

(*See also* 2407, 2415i, 2735, 2864e, 2965, 3184.)

2667. Cressman, A. W., Yust, H. R., and Eichorn, D.
Gastight fabrics—for use in fumigating with hydrocyanic acid gas.
Circ. U.S. Dep. Agric. **978**, 1955, pp. 14, bibl. 7, illus.

A summary is given of investigations made at the Whittier, Calif., laboratory in developing a gastight plastic-coated fabric suitable for tree fumigation with HCN. The most satisfactory fabric was found to be a dispersion of vinyl chloride-vinyl acetate copolymers of high molecular weight with mixed phthalate and phosphate plasticizers on nylon cloth. Fumigation tents of this material remained gastight or nearly gastight during 5 years of use.

2668. McNabb, H. S., Jr., and others.
The use of the thulium X-ray unit in determining decay in living trees.
From abstr. in *Phytopathology*, 1956, **46**: 20.

Research on the development of non-destructive techniques for the determination of decay in standing trees has yielded favourable results with the use of the thulium X-ray unit, of which a description is given. Trials showed that an exposure of 5 minutes was the best for the species studied (*Acer saccharinum*). Decay is usually indicated by non-uniform areas on the developed negative.

2669. Moore, W. T., and Mason, B.
A lesion counter.
Lab. Practice, 1956, **5**: 179, illus.

The instrument described provides a rapid and accurate method of counting leaf lesions. The leaf is placed on an illuminated metal mesh screen. The illumination enables the lesions to be seen clearly and a pointer is pricked through each lesion. The light shines through the pricked hole, recording that the lesion has been counted. The counting is automatic as the pointer in pricking the leaf touches the screen and completes the circuit of an electro-magnetic counter. The instrument can also be adapted for counting bacteria.—I.C.I. Ltd., Akers Res. Labs, Welwyn, Herts.

Noted.

2670.

a Andrén, F.
Besprutningsförsök mot äppleskorv 1954. **(Spraying trials for the control of apple scab in 1954.)**
Växtskyddsnotiser, 1955, No. 1, pp. 14-17.
Data on many fungicides tested on two varieties.

b Anon.
Ryania, a selective insecticide.
Agric. Res. Wash., 1955, **4**(6): 16.
Toxic to codling moth, but not to beneficial insects, plants or mammals.

c Bobb, M. L.
The oriental fruit moth and its control in Virginia.
Bull. Va agric. Exp. Stat. **457**, 1953, pp. 11, bibl. 4, illus.
DDT, parathion and EPN effective.

d Chamberlain, G. C., and Putman, W. L.
Diseases and insect pests of the raspberry in Canada.
Publ. Canada Dep. Agric. **880**, revised 1955, pp. 34, illus.
This bulletin [see *H.A.*, 23: 2757] has been revised to include brief references to diseases and insect pests of other cane fruits.

e COLE, J. R., AND GOSSARD, A. C.
Stuart pecan found to be susceptible to scab in Mississippi.
Plant Dis. Reptr, 1956, **40**: 156.
After 50 years' resistance has become susceptible.

f CREUTZ, G.
Starenabwehr durch Anwendung eines Tonbandes. (Vorläufige Mitteilung.) (**Protection against starlings by sound recordings. Preliminary communication.**)
NachrBl. dtsch. PflSchDienst., Braunschweig, 1956, **8**: 54-5.
Promising results from alarm notes in a cherry orchard.

g CROSSE, J. E.
An epidemic leaf spot and spur wilt of cherry caused by *Pseudomonas morsprunorum.*
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 121-5, bibl. 10.
Symptoms, dissemination by wind-driven rain, and observations on control measures.

h FERON, M., BENAS, G., AND GUENNELON, G.
Lutte contre la mouche de la cerise en France en 1953–1954. (**Control of cherry fruit fly in France in 1953-1954.**)
Congr. pomol. Annecy, 1954, 1955, pp. 77-93, bibl. 7, illus.
Co-operative control of *Rhagoletis cerasi* by DDT in S.E. France.

i FOSCHI, S.
Gli acari delle piante da frutto. (**Mites of fruit plants.**)
Mod. Fruttic., 1955, reprinted as [*Publ.*] *Ist. Pat. veg. Bologna*, [1955?], pp. 22, bibl. 35, illus.
The eriophyid and tetranychid mites and their control.

j FOSCHI, S.
Cascola dei frutti, ipertrofia delle borse e sfogliatura dei peduncoli e dei rami di melo provocati da eccesso di umidità. (**Fruit drop, bourse hypertrophy and bark scaling of the peduncles and branches of apples due to excessive humidity.**) [English summary ½ p.]
Ann. Sper. agrar., 1956, **10**: 427-37, bibl. 7, illus.
Phenomena attributed to excessively wet autumn.

k GASSER, R.
Le problème des araignées rouges en culture fruitière. (**The problem of red spider in fruit growing.**)
Congr. pomol. int., Paris, 1955, 1956, pp. 135-48, bibl. 28, illus.
Species, predators and control in Switzerland.

l GLAUCO, R.
Esperimenti di lotta contro insetti dannosi mediante prodotti a base di canfene clorurato. (**Experiments on the control of injurious insects with chlorinated camphene.**)
Boll. Zool. agrar. Bachic., 1954, **20**: 193-201, bibl. 2.
Toxaphene effective against range of pests.

m GRAVES, C. H., JR.
Tests seek to improve control of important peach diseases.
Miss. Fm Res., 1955, **18**(12): 7, illus.
Brown rot and peach scab controlled by wettable sulphur or captan.

n HARRIS, R. W., AND GRIGGS, W. H.
Russet on Bartletts.
Calif. Agric., 1956, **10**(2): 9, 12, 15, illus.
Caused by copper and streptomycin. [See *H.A.*, 26: 353.]

o HEWITT, W. B.
Yellow vein, a disease of grapevines caused by a graft-transmissible agent.
From abstr. in *Phytopathology*, 1956, **46**: 15.
Resulting in the setting of little or no fruit and yellow blotching and banding.

p HEWITT, W. B.
Fanleaf virus of grapevines is soil borne.
From abstr. in *Phytopathology*, 1956, **46**: 15.

q HOLMES, E.
Low volume spraying of fruit and hops.
Agriculture, Lond., 1956, **62**: 583-6, illus.
A review, with suggested programmes.

r HORSFALL, F., JR.
Mouse control in Virginia orchards.
Bull. Va agric. Exp. Stat. **465**, 1953, pp. 26, illus. [received 1956].
For later reports on ground sprays see *H.A.*, 25: 1532 and 26: 1620.

s HUFFAKER, C. B., AND KENNETT, C. E.
Control of cyclamen mite.
Calif. Agric., 1956, **10**(3): 7, 12.
On strawberries; see also *H.A.*, 24: 2490.

t JENSEN, D. D.
Evidence that celery is a host of peach yellow leaf roll virus.
From abstr. in *Phytopathology*, 1955, **45**: 694.
Insect transmission of virus between tree and herbaceous plants.
Virology, 1956, **2**: 249-60, bibl. 18, illus.

u DE JONG, D. J., AND BEEKE, H.
Vroege wormstekigheid bij appel veroorzaakt door *Pammene argyrana* Hb. (Tortricidae, Lepid.). (**Early maggot infestation in apple caused by *Pammene argyrana*.**) [English summary ¼ p.]
Meded. Dir. Tuinb., 1956, **19**: 100-4, illus.
Vroege wormstekigheid bij appel en peer. (***Pammene argyrana* on apples and pears.**)
Fruitteelt, 1956, **46**: 346-7, illus.
Biology and control with parathion.

v KIDO, H., AND STAFFORD, E. M.
The biology of the grape bud mite *Eriophyes vitis* (Pgst.).
Hilgardia, 1955, **24**: 119-42, bibl. 25, illus.
No relationship established between infestation and growth or yield.

w KOSTIK, F. D.
Development of phylloxera on the leaves of European varieties of vine. [Russian.]
Agrobiologija, 1955, No. 2, pp. 120-4, illus.
Effects of variety and environment.

x MAI, W. F., AND PARKER, K. G.
Evidence that the nematode *Pratylenchus penetrans* causes losses in New York State cherry orchards.
From abstr. in *Phytopathology*, 1956, **46**: 19.
Young cherries severely stunted.

y MALLINJOUD, H.
Les insectes du framboisier. **(Raspberry insects.)**
Congr. pomol. Annecy, 1954, 1955, pp. 131-40, bibl. 19, illus.
And their control.

z VAN MARLE, G. S.
Tijdstippenproeven betreffende de bespuiting tegen vruchtrot in aardbeien. **(Experiments on time of spraying strawberries for fruit rot control.)**
Tijdschr. PlZiekt., 1956, **62**: 25.
TMTD applications during full bloom were best.

2671.

a MATHLEIN, R.
Några bekämpningsförsök mot sorkar. **(Trials on the control of voles.)**
Växtskyddsnotiser, 1955, No. 4, pp. 57-9, illus.
With warfarin baits; see also *H.A.*, 25: 384.

b MILLER, P. M.
Open calyx tubes as a factor contributing to carpel rots of apples.
From abstr. in *Phytopathology*, 1956, 46: 21.
As found in the Wagener variety.

c MINISTRY OF AGRICULTURE, LONDON.
Codling moth.
Adv. Leafl. Minist. Agric. Lond. **42**, amended 1955, pp. 4, illus.
Cydia pomonella.

d MINISTRY OF AGRICULTURE, LONDON.
Gooseberry red spider mite.
Adv. Leafl. Minist. Agric. Lond. **305**, amended 1955, pp. 3.
Bryobia praetiosa.

e MINISTRY OF AGRICULTURE, LONDON.
Silver leaf disease of fruit trees.
Adv. Leafl. Minist. Agric. Lond. **246**, revised 1954, pp. 8, illus.
Stereum purpureum.

f MINISTRY OF AGRICULTURE, LONDON.
Wingless weevils.
Adv. Leafl. Minist. Agric. Lond. **57**, amended 1955, pp. 4, illus.
Otiorrhynchus spp.

g MORVAN, G.
Le dépérissement de l'abricotier. I. Les différentes formes de dépérissement. **(The decline of the apricot. I. Different forms of decline.)**
Ann. Épiphyt., 1956, **7**: 211-27, bibl. 26, illus.
Verticillium wilt, etc.

h MORVAN, G.
Les maladies à virus de l'abricotier. **(Apricot virus diseases.)**
Congr. pomol. Annecy, 1954, 1955, pp. 111-14, illus.

i PFEIFER, R. P.
A bird-control apparatus for experiment plots.
Agron. J., 1956, **48**: 139-41, illus.
Electrified wires used to protect corn; see also *H.A.*, 26: 427.

j PITCHER, R. S.
A further note on a cambium miner of *Prunus* spp. (*Dendromyza cerasiferae* Kangas, Agromyzidae, Dipt.).
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 139-40, bibl. 6.
Life history, parasites and economic importance.

k POSNETTE, A. F.
Strawberry mosaic virus disease.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 120, bibl. 2, illus.
An uncommon, graft-transmissible disease described.

l PRESCOTT, G. C., EMERSON, H., AND FORD, J. H.
Determination of cycloheximide (acti-dione) residues in cherries.
J. agric. Food Chem., 1956, **4**: 343-5, bibl. 4.

m RIGGS, R. D., SLACK, D. A., AND FULTON, J. P.
Meadow nematode and its relation to decline of strawberry plants in Arkansas.
From abstr. in *Phytopathology*, 1956, **46**: 24.
Pratylenchus coffeae associated with black root disease.

n RUTTER, A. E. H.
Production of virus-free strawberry runners.
Worthing and W. Sussex Grs' Mag., 1955, No. 7, pp. 269-70 reprinted with amendments in *A.R. E. Malling Res. Stat. 1955*, 1956, **A39**: 153-4, illus.
Testing for virus, heat treatment and runner production.

o S., M.
De perzikscheutboorder. **(The peach twig borer.)**
Cult. Hand., 1956, **22**: 119-21, illus.
Life-history and control of *Anarsia lineatella.*

p SCHWOPE, D.
Bekämpfung der Kirschfruchtfliege in hängigem Gelände mit Hilfe des Wirkstoffnebelverfahrens. **(Control of the cherry fruit fly in hilly country by means of mist applications.)**
Dtsch. Gartenb., 1956, **3**: 100-102, illus.
With DDT, if properly timed.

q SEINHORST, J. W., KLINKENBERG, C. H., AND V.D. MEER, F. A.
Aantasting in frambozen door *Pratylenchus penetrans* (Cobb.) Sher et Allen. **(Raspberries attacked by *Pratylenchus penetrans*.)** [English summary ¼ p.]
Tijdschr. PlZiekt., 1956, **62**: 5-6.
Symptoms.

r SMITH, E. H.
Further studies on the ovicidal action of parathion to eggs of the peach tree borer.
J. econ. Ent., 1955, **48**: 727-31, bibl. 13, illus.
Sanninoidea exitiosa; see also *H.A.*, 25: 1523.

s SNAPP, O. I.
Peach insect investigations at Fort Valley, Georgia, during 1954.
J. econ. Ent., 1955, **48**: 734-6, bibl. 4.
Control of *Conotrachelus nenuphar*, *Sanninoidea exitiosa* and *Synanthedon pictipes*.

t SOENEN, A.
Aperçu sur l'efficacité et les influences secondaires des fongicides courants. **(A glance at the efficiency and secondary effects of present day fungicides.)**
Fruit belge, 1956, **24**: 41-3.
Materials for scab control evaluated.

u SOMERS, E.
Studies of spray deposits. I.—Effect of spray supplements on the tenacity of a copper fungicide.
J. Sci. Food Agric., 1956, **7**: 160-72, bibl. 23.
Polyvinyl acetate a suitable sticker for copper fungicides.

v STEARNS, L. A., HEUBERGER, J. W., AND STEVENS, R. F.
Delaware's 1956 spray schedules for control of fruit insects and diseases in orchards and home plantings.
Ext. Folder Del. agric. Ext. Serv. **44**, 1956, 1 folded sheet.
Apples, peaches and vines.

w TWOMEY, J. A., AND BLODGETT, E. C.
Twisted leaf of cherry.
Proc. Wash. St. hort. Ass. 1955, pp. 99-100, bibl. 3.
Symptoms of this serious virus disease described.

x WILLIAMS, H. E., AND MILBRATH, J. A.
Freckle fruit of sweet cherry.
From abstr. in *Phytopathology*, 1955, **45**: 696.
A virus-like condition affecting fruits, but not leaves, of Lambert cherries.

y WOODSIDE, A. M.
The apple bark borer.
Bull. Va agric. Exp. Stat. **452**, 1952, pp. 16, bibl. 4, illus. [received 1956].
Control of *Thamnosphecia pyri*; see also *H.A.*, 22: 3676.

WEEDS AND WEED CONTROL.*

General.

2672. FRANKTON, C., AND WRIGHT, W. H.
Weeds of Canada.
Publ. Canada Dep. Agric. **948**, 1955, 9½×6½ in., pp. 196, illus., $1.00.
Notes on 205 species, 133 of which are illustrated by full-page line drawings, include popular and scientific names, botanical descriptions, origin, distribution in Canada, habitats, and special features which make it possible to distinguish between superficially similar plants.

2673. PLANT PROTECTION LTD. (SCOVELL, D. L. W., AND SCOVELL, E. O.).
Common farm weeds illustrated.
Butterworths Scientific Publications, London, 2nd impression, 1954, 8½×5½ in., pp. 172, illus., 15s.
The book is divided into two sections, one devoted to arable weeds and the other to grassland weeds. Subdivisions within each section are based on flower colour. Each weed is represented by two clear photographs, the one showing its early vegetative growth and the other its flowers or fruits. These are accompanied by brief descriptive notes.

2674. SHELL CHEMICAL CO. LTD.
Farm weeds: an aid to their recognition.
Shell Chemical Co., Ltd., London, 2nd edition [1956?], 8½×5½ in., pp. 80, illus., 5s.
Handsome coloured plates of 60 plants, reproduced from water colours by Doris R. Thompson, are followed by notes on the plants arranged alphabetically under their English names. The notes give scientific and popular local names and brief descriptions of the plants and their main characteristics as weeds.

2675. NATIONAL WEED COMMITTEE, CANADA.
Report of the Herbicide Committee, National Weed Committee, Eastern Section, for 1956, Dep. Agric. Ottawa, Canada, 1955, pp. 23.
As in the preceding year [see *H.A.*, 25: 2739] chemical treatments in specified crops and against specific weeds are recommended or suggested for trial. The report contains a long list of weeds indicating their susceptibility to 2,4-D and information on the herbicides

* The note *Weed Abstr.*, plus volume and abstract number, appearing at the end of an abstract, indicates that it has been copied in whole [*Weed Abstr.*] or part [From *Weed Abstr.*] from *Weed Abstracts* issued by the Unit of Experimental Agronomy, Agricultural Research Council, Dept. Agriculture, University of Oxford.

referred to in the text. The publication is intended for research workers only.

2676. Anon.
Report of the Research Committee of the Southern Weed Conference for 1955.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 419-52.
The headings in the report include tobacco, vegetables, fruits, ornamentals, turf, some grass weeds and newer herbicides.—From *Weed Abstr.*, **4**, No. 1034.

2677. Anon.
Recommendations of the Research Committee of the N.C.W.C.C. Recommendations of the Committee on terminology.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 135-51.
The recommendations are grouped under the following headings: Control of herbaceous perennial weeds, woody plants, weed control in field crops, pastures and meadows, horticultural crops, fruits and flowers.—From *Weed Abstr.*, **4**, No. 1803.

2678. Iowa State College.
Your experiment station reports. Ornamentals, fruits, vegetables.
Ia Fm Sci., 1956, **10**(8): 21-4, illus.
Among results briefly reported are the following: After low concentration applications of 2,4-D in July, Concord grapes failed to ripen. Alanap [NPA] as a wettable powder or emulsion gave excellent control of crabgrass in melons when sprayed immediately after sowing. Maleic hydrazide and dichloral urea (DCU) appear to be effective in inhibiting strawberry runner production. Crag I [2,4-DES] gave excellent control of crabgrass on a golf-course fairway, but DCU, which also gave good control, slowed down bluegrass growth.

Control of perennial weeds.

(*See also* 2737g.)

2679. Phillips, W. M.
Control of deep-rooted perennial weeds with 2,4-D-boron complexes and other soil sterilizing chemicals.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 44-6.
Sodium chlorate±borate, several boron compounds, CMU, PDU, 2,4-D+boron and high rates of 2,4-D were tested for the control of *Convolvulus arvensis*. Sodium chlorate at 4–6 lb./sq. rod, CMU and PDU at 60–80 lb./ac. gave good control. The other compounds, including 2,4-D at 80 lb./ac. applied in the spring, were not satisfactory. Sodium chlorate, 2,4-D±boron, soluble boron and borate-chlorate mixtures gave better control of *Franseria* sp. than CMU. —*Weed Abstr.*, **4**, No. 1820.

2680. Turnquist, O. C.
Control of quack grass in vegetable gardens.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 81-2, bibl. 2.
The results of various combinations of cultural and TCA treatments of *Agropyron repens* in the autumn are reported. *A. repens* was equally well controlled by 38 lb./ac. as by 114 lb./ac. TCA. If only one discing was applied little differences in weed control were observed if this was done before or after chemical treatment. The growth and yield of vegetables planted in the following spring were not affected.—*Weed Abstr.*, **4**, No. 1725.

2681. Santelmann, P. W., and Willard, C. J.
Dalapon for quackgrass control.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 63-4.
Treatment of *Agropyron repens* with dalapon in the autumn without ploughing gave better control than spring treatments.—From *Weed Abstr.*, **4**, No. 1714.

2682. Burt, E. O.
Control of nutgrass (*Cyperus rotundus* L.) with herbicides and tillage.
Proc. 8th annu. Mtg south. Weed Conf. 1955, pp. 405-8.
Repeated applications of amino triazole and 2,4-D and a single application of dalapon were effective in controlling nutgrass top growth.—*Weed Abstr.*, **4**, No. 1029.

2683. Hauser, E. W., Thompson, J. T., and Stacey, S. V.
The effects of chemicals on the control of Johnson grass and nutgrass with and without disking.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 399-404, bibl. 3.
Sorghum halepense. The most promising chemicals for control at an early stage of growth were dalapon 10 lb./ac., TCA 50 lb./ac. and 4-CPA [=4-chlorophenoxyacetic acid] 20 lb./ac. Each of these when followed by cultivation gave 75% reduction in stand. With CMU, TCA and amino triazole, better control was obtained by disking after application of the chemicals, but disking showed no advantage after application of dalapon. *Cyperus rotundus*. Amino triazole was promising.—From *Weed Abstr.*, **4**, No. 1028.

2684. Arle, H. F., and Everson, E. H.
Johnson grass control.
Bull. Ariz. agric. Exp. Stat. **265**, 1955, pp. 10, illus.
A general field infestation of Johnson grass, *Sorghum halepense*, is best controlled by shallow ploughing at 5-week intervals throughout the summer, and small local infestations by hand-hoeing or spot treatments with soil sterilants. On ditch banks repeated applications of aromatic oils or autumn treatments with TCA, borate-chlorate combinations or sodium chlorate were found to give satisfactory results, and dalapon also showed promise.

2685. Rea, H. E.
The effectiveness of dalapon in controlling Johnson grass.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 394-96.
Seedlings of both annual grasses and *Sorghum halepense* were highly resistant to stem applications of dalapon, but stands of short growth *S. halepense* were reduced 90% by broadcast spraying of dalapon 30 lb.+wetter or in oil, and by 2 or more foliage applications of dalapon 15 lb./ac.—From *Weed Abstr.*, **4**, No. 1026.

2686. Tafuro, A. J., and Beatty, R. H.
Progress report with greenhouse tests on Johnson grass seedlings using Amizol (3-amino-1,2,4-triazole) as an additive with other herbicides.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 386-91.

In greenhouse tests on *Sorghum halepense* amino triazole at 0·125, 0·250 and 0·5 lb./ac. caused chlorosis and some stunting but no kill. Dalapon at 1 and 2 lb./ac. with American Cyanamid 6249 gave no kill of *S. halepense*, but when it was used with amino triazole kills ranged from 50–88% with a considerable decrease in dry weights of leaves and roots. There were small differences between the effects of dalapon used with and without amino triazole.—*Weed Abstr.*, **4**, No. 1024.

2687. Rea, H. E., and Norris, M. J.
Hexachloroacetone and related herbicides for controlling Johnson grass.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 392-93.

Hexachloroacetone ¼ pt./gal. of oil was very effective for the crown treatment of established *Sorghum halepense*. Various oils were tested as carriers and Varsol 1 was found to be the best.—*Weed Abstr.*, **4**, No. 1025.

Control of aquatic weeds.

(*See also* 2737i.)

2688. Timmons, F. L.
Summary of recent research findings on control of submersed aquatic weeds in irrigation systems of the West.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 359-63.

Aromatic solvents. Rates of 5·4–5·9 gal./cu. ft./sec. of flow in the channel gave control of *Anacharis canadensis*, *Zannichellia palustris* and *Potamogeton foliosus* for periods up to 5 or 6 weeks for distances of ¾–1½ miles below the point of application. A rate of 8·1 gal./cu. ft./sec. was effective on these species for 8 weeks and also on *P. pectinatus*. A rate of 10 gal./cu. ft./sec. was necessary for [complete?] control of *P. richardsonii*, *P. pectinatus*, *P. interruptus*, *P. nodosus* and *Heteranthera dubia*. *Chlorinated benzenes.* TBA [=trichlorobenzoic acid] 85% gave better results than a commercial aromatic solvent, and 10 gal./cu. ft./sec. applied in 30 min. gave excellent kill of submersed aquatic species. *Rosin Amine D Acetate* at 10–12 p.p.m. gave control of green and red algae. Sodium chlorate, sodium borate and CMU were ineffective against submersed aquatic species.—From *Weed Abstr.*, **4**, No. 1020.

2689. Williams, R. H.
***Salvinia auriculata* Aubl.: the chemical eradication of a serious aquatic weed in Ceylon.**
Trop. Agriculture Trin., 1956, **33**: 145-57, illus.

Two applications 2–3 weeks apart of 10 gal. Shell *Salvinia* Weedkiller, viz. 12% PCP plus wetting agents in an oil emulsion, in 190 gal. water per acre gave complete control.—Shell Co. Ceylon Ltd., Colombo.

Weed control in fruit crops.

(*See also* 2417, 2513, 2521, 2737a.)

2690. Poignant, P., Chaffard, M., and Thellot, B.
L'emploi des désherbants dans les vergers et les vignobles et des défoliants dans les pépinières fruitières. **(The use of herbicides in orchards and vineyards, and of defoliants in fruit nurseries.)**
Congr. pomol. int., Paris, 1955, 1956, pp. 151-64, bibl. 2, illus.

Control of thistles and bindweed in orchards may be obtained by spot treatment with a sodium or amine salt of MCPA or 2,4-D. MCPA or 2,4-D may also be applied as a pre-planting treatment. Couch grass control may be obtained by TCA applied in the autumn or spring before planting. In established orchards and vineyards 2 applications of TCA at a 3-week interval are recommended. TCA should not be applied when the plants are less than 5 years old, but when used after this age at 35–40 kg./ha. no toxicity symptoms have been observed on apple, apricot, cherry, peach, pear, plum or vine. Four-year-old apple trees treated with 100 kg. of TCA per ha. showed temporary leaf curling. Annual weeds may be controlled by spring applications of CMU at a rate of about 2 kg./ha. In strawberries low concentrations of MCPA or 2,4-D applied a fortnight after planting have controlled weeds; in established plantations treatment during dormancy with ammonium dinitrophenate, or during growth with 2,4-D, has proved effective. Preliminary results from tests for defoliants have shown that contact herbicides were not successful, but promising results were obtained with certain growth regulators.

2691. Holm, L., and Gilbert, F. A.
Weed control in apple and cherry orchards.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 83-4.

Endothal at 10 lb./ac. and CIPC at 20 lb./ac. did not injure the trees when used for weed control in cherry orchards for 4 successive years. CMU at 2·5 lb./ac. was non-toxic but 5 and 10 lb./ac. applications caused some leaf discoloration. CMU at 2·5–10 lb./ac. and CIPC at 50 lb./ac. did not injure apple trees.—*Weed Abstr.*, **4**, No. 1727.

2692. Carlson, R. F.
The effect of CIPC on field sorrel in strawberry plantings.
Quart. Bull. Mich. agric. Exp. Stat., 1956, **38**: 365-7.

In October (1953 and 1954) CIPC at rates of 2 and 3 lb./acre was applied to commercial plantings of Catskill and Premier strawberries. The effect of the herbicide was rather slow, but by the following May 60–70% of the seedling sorrel [*Rumex acetosella*] was dead and the older plants were stunted [see also *H.A.*, 26: 472]. Growth and yield of strawberry plants was not affected by autumn treatment with CIPC.

2693. Carlson, R. F.
CMU as a herbicide in vineyards.
Quart. Bull. Mich. agric. Exp. Stat., 1956, **38**: 409-12.

CMU gave successful results in 5 vineyards containing

7 grape varieties when applied in the spring at 3, 6 and 9 lb./acre [see also *H.A.*, 26: 473]. Weed control at the 6- and 9-lb./acre rates was excellent. Some temporary leaf yellowing occurred at the higher rates on very light soils. Fruiting was normal at all locations, but there was some indication of delay in ripening at the 9-lb. rate.

2694. Hemphill, D. D.
Chemical weed control in vineyards.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 82-3, bibl. 1.

CMU 2 lb./ac., PDU 2 lb./ac. and CIPC 10 lb./ac. were compared with a dinitro spray and there were indications that they may be inferior for weed control in mature grapes. CMU and PDU are toxic in recently planted vineyards.—*Weed Abstr.*, **4**, No. 1726.

Weed control in nurseries and shelter belts.

2695. Chadwick, L. C., and Barker, P. A.
Chemical weed control in *Taxus*.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 84-6, bibl. 2.

The herbicides tested for weed control in a 4-year-old nursery containing *Taxus cuspidata intermedia* were 2,4-D (amine) 1 lb./ac., NP 5 lb./ac., CIPC 7·5 lb./ac., MH (40) 20 lb./ac., 2,4-DES 3 and 4 lb./ac. and NIX [=sodium isopropyl xanthate] 12 and 24 lb./ac. With the possible exception of CIPC and NIX none of the herbicides damaged the *Taxus* plants. It is suggested that a weed-free nursery might best be obtained by applying a directed foliage herbicide such as 2,4-D, NIX or CIPC followed by 2,4-DES, CIPC or NPA before new weeds emerge.—*Weed Abstr.*, **4**, No. 1728.

2696. Chadwick, L. C., and Barker, P. A.
Chemical weed control in deciduous and evergreen nursery stock.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 86-8, bibl. 5.

2,4-DES at 4 lb. in 80 gal. water/ac. was applied to 120 species of deciduous and evergreen trees and perennial flowers. Injuries to *Ligustrum obtusifolium, Euonymus kiautschovicus, E. fortunei* and *E. alatus* are described. —*Weed Abstr.*, **4**, No. 1729.

2697. Ferrell, E. K.
Chemical weed control in shelterbelts.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 117-19.

CMU at 20 lb./ac. was more effective for weed control under tree shelterbelts than dinoseb 1·125 lb./ac., Stoddard Solvent 50 gal./ac., Ammate 325 lb./ac. or 2,4-DES 2·25 lb./ac. Date of application of CMU was not important, while dinoseb and Stoddard Solvent gave far better results with early application.—*Weed Abstr.*, **4**, No. 1792.

Weed control in lawns.

2698. Breakey, W. J.
Weeds in lawns.
Res. Rep. nat. Weed Cttee (west. Sect.) Canada, 1955, Regina, Sask., p. 78.

Dow M.C.2 (98% methyl bromide+2% chloropicrin) was applied at 1 lb./100 sq. ft. to a lawn seed-bed under a gas-proof tent which was left on for 48 hr. Vapam (sodium n-methyl dithiocarbamate dihydrate) was applied at 1 lb. acid equivalent/100 sq. ft. to well-watered plots. Both treatments were 100% effective in sterilizing the soil and there was no residual effect from either on a new lawn seeded 14 days after treatment.—*Weed Abstr.*, **5**, No. 391.

2699. Walker, C.
Weed control in lawns and playing greens.
Proc. 8th N.Z. Weed Control Conf., 1955, pp. 96-100.

The following herbicides were compared on a browntop—chewings fescue sward invaded with flat weeds, moss, etc.: MCPA, 4-CPA [=4-chlorophenoxyacetic acid], 2,4-D+2,4,5-T, 2,4-D+ petrol, 2,4-D+TCA, CMU. The best treatment consisted of 1 lb./acre MCPA with 2·5 lb./acre 2,4,5-T. The application of this treatment combined with fertilizer and reseeding was successful in renovating a weedy lawn. From investigations on the effect of growth regulating substances on grass seeds sown 1, 2 and 4 weeks after spraying it would appear that reseeding can be safely carried out 3–4 weeks after treatment. PCP (sodium) at 1 and 2 oz./1,600 sq. ft. appears promising for the control of mosses; 2,3-dichloro-1,4-naphthoquinone was unsatisfactory and gave variable results.—*Weed Abstr.*, **4**, No. 1907.

2700. Albert, W. B.
Chemical weed control in establishing Coastal Bermuda grass.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 222-5.

The following herbicides, applied immediately after planting, controlled *Digitaria sanguinalis* for 3–6 weeks and permitted establishment of a stand of Bermuda grass though of reduced number: NPA 4 lb./ac., CIPC 6 lb./ac., PDU 2 lb./ac., 2,4-D 1·5 lb./ac. and 3,4-DDU [=3-(3,4-dichlorophenyl)-1,1-dimethyl urea] 2 lb./ac. When applied 3 weeks after planting, Bermuda grass was tolerant of 3 lb./ac. of dinoseb, 18 gal./ac. of 60% NH_4NO_3+wetter and 40 gal./ac. of 2% potassium cyanate+wetter.—From *Weed Abstr.*, **4**, No. 970.

2701. Hauser, E. W., Thompson, J. T., and Crowder, L. V.
Progress report on chemical weed control in sprigged Coastal Bermuda grass.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 217-22.

The results of applying 2,4-D at 1–3 lb./ac., NPA at 2–6 lb./ac., 2,4-DES at 2–4 lb./ac., 3,4-DDU at 0·75–1·25 lb./ac., dinoseb at 1–4 lb./ac. and dalapon at 4 lb./ac. to Coastal Bermuda grass at 3 dates after sprigging are reported. Good pre-emergence weed control was obtained with 2,4-DES, 2,4-D and NPA. None of the treatments applied six weeks after sprigging gave control of weeds and grasses. Only the dalapon and 6 lb./ac. 3,4-DDU combinations injured the Bermuda grass.—*Weed Abstr.*, **4**, No. 969.

2702. Miller, E. V., Miller, A. E., and Mesiano, E.
Effect of maleic hydrazide on growth and reproduction of the sandbur.
Bot. Gaz., 1955, **117**: 76-8, bibl. 6.

The results of greenhouse experiments indicate that sandbur, *Cenchrus tribuloides*, a common weed of lawns in the southern U.S.A., can be satisfactorily controlled with MH. Solutions containing 4,000 p.p.m. active MH should be applied within 2 weeks after emergence. Germination of a second grain in the bur subsequent to spraying makes one application only partially effective, and 3 applications given at weekly intervals are necessary to ensure complete control. Mature plants were not destroyed by MH (4,000 or 8,000 p.p.m. active ingredient), although growth was retarded and fruiting was considerably reduced. A warning is given against using MH on lawns without first determining the sensitivity of the other grasses to the compound.—Univ. Pittsburgh, Pa.

Weed control in vegetables.

(*See also* 2737a, d, l-n, u, 2738.)

2703. Yeates, J. S.
Crop tolerance trials with TCA.
Proc. 8th N.Z. Weed Control Conf., 1955, pp. 111-13.

TCA at from 5 to 200 lb./ac. was applied in February to plots which were planted in March (autumn) with broad beans, swedes, onions, turnips, peas and some other crops. The effects on these crops at 2 dates are described. Most notable was the resistance of the crucifers to TCA even at 100 lb./acre.—*Weed Abstr.*, **4**, No. 1862.

2704. Blackett, R. D.
A new herbicide for the root-break.
Fmrs' Wkly, 1956, **44**(15): 89, illus.

Pre-emergence applications of pentachlorophenol (PCP) formulations have given successful weed control in root crops for up to 6 weeks. For crops of which the seeds germinate within 10 days of sowing, i.e. carrots, kale, swedes and turnips, drilling should be carried out with as little soil disturbance as possible 3 days after the seed bed has been prepared, and the herbicide should be applied 3 days later. For crops of which the seeds germinate 10 to 20 days after sowing, i.e. peas, beans and various beets, the time lag between sowing and spraying should be about 5–8 days.

2705. Alban, E. K.
Weeding asparagus with chemicals.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 77-8.

Suggestions for the chemical control of weeds in asparagus at 4 stages of growth are given: (1) *Pre-harvest:* after discing, 2,4-D 1–1·5 lb./ac., CIPC 5 lb./ac., alkanolamine salts of DNP [=dinitrophenol] 6–8 lb./ac. or 2,4-DES 3–4 lb./ac. (2) *Cutting season:* emergency treatments after close cutting, dinoseb 3–4 lb./ac., PCP 6–8 lb./ac., NIX [=sodium isopropyl xanthate] 16 lb./ac., TCA 6 lb./ac. or dalapon 3 lb./ac. (3) *Post-cutting:* pre-emergence, 2,4-D 1–1·5 lb./ac., TCA 6 lb./ac., dalapon 3 lb./ac., CIPC 6 lb./ac., dinoseb 4–6 lb./ac., 2,4-DES or Natrin [=2,4,5-TES] 3–4 lb./ac., NPA 5 lb./ac. (4) *Post-harvest:* directed post-emergence basal application, CIPC 6 lb./ac. +NIX 16 lb./ac., PCP 20 lb./ac., 2,4-D 1 lb./ac. +TCA 6 lb./ac. or dalapon 3 lb./ac., CIPC 6 lb./ac. +PCP 16 lb./ac. Ideally the same chemical should not be used twice in a given growing season.—*Weed Abstr.*, **4**, No. 1722.

2706. Pengelly, R.
Chemical weeding of asparagus.
Proc. 7th N.Z. Weed Control Conf., 1954, pp. 71-4.

Under the conditions of this experiment on asparagus CMU at 2½ lb. was the best treatment, whilst CIPC at 8 lb. was the next most effective. IPC at 8 lb. controlled *Polygonum arvensis*, *Spergula arvensis* and seedling grasses but was ineffective against *Chenopodium album* and *Sonchus arvensis*. Dinoseb and DNAP [or dinosam]+dinoseb in dieseline gave good initial control. DNC had greater residual action. IPC+DNAP+dinoseb proved very effective until asparagus ferns were fully developed. Sodium cyanate, TCA and calcium cyanamide were unsatisfactory.—*Weed Abstr.*, **4**, No. 124.

2707. Burgis, D. S.
Oktone for pre-emergence chemical weed control in crucifers.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 206-8.

In 2 seasons' trials cabbage yields were increased after application of liquid Oktone [=octachlorocyclohexenone]. At a rate of 8 lb. per acre control of most annual weeds and grasses was good. In a third season weed control with dry and liquid formulations of Oktone was equally good, and cabbage and cauliflower yields from the dry-Oktone-treated plots were higher than those from control plots and from those treated with liquid Oktone.—Gulf Coast Exp. Stat., Bradenton.

2708. Guzman, V. L., and Wolf, E. A.
Chemical weeding of cabbage in muck soils.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 335-43.

TCA at 20 lb./ac. and octachlorocyclohexenone at 10 lb./ac. were the best pre-emergence herbicides in cabbage and did not affect yields. Post-emergence applications of 10 lb./ac. NIX [=sodium isopropyl xanthate] gave good weed control but reduced the size of the cabbage heads. Combination pre- and post-emergence treatments of TCA or octachlorocyclohexenone with NIX significantly reduced yields of cabbage. Pre-transplanting treatment with octachlorocyclohexenone at 8 lb./ac. did not affect cabbages transplanted 9 and 34 hours after treatment. CMU was in most cases very toxic to cabbages. Endothal was a good selective herbicide but of short residual toxicity to weeds.—*Weed Abstr.*, **4**, No. 1015.

2709. Till, J. F.
The control of weeds in brassica crops.
Proc. 8th N.Z. Weed Control Conf., 1955, pp. 74-6.

CIPC at 0·5 to 1 lb./acre suppressed germination and growth of swedes but they were unaffected by IPC at 4 lb./acre. From the results of numerous trials with TCA it is concluded that it should be applied at 20–30 lb./acre on recently harrowed, moist ground immediately after sowing. Octochlorocyclohexenone at 1–1·5 gal. in 12–20 gal. of dieselene is useful if application is carefully timed approximately 24 hours before germination.—From *Weed Abstr.*, **4**, No. 1898.

2710. Alban, E. K.
Some environmental factors which influence the use of DNBP with sweet corn, lima and snap beans.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 80-1.
Damage from dinoseb application was associated with high temperatures. Rates of 4–6 lb./ac. which could safely be used at 60–75° F. needed to be reduced to 2–3 lb./ac. at higher temperatures.—*Weed Abstr.*, **4**, No. 1724.

2711. Bruns, V. F.
The response of certain crops to 2,4-dichlorophenoxyacetic acid in irrigation water.
Weeds, N. York, 1954, **3**: 359-76, bibl. 7, illus.
The response of Red Mexican beans to field application of 2,4-D at 2 and 6 lb./ac. in irrigation water was studied during the seedling and bloom stages. The response of the beans to this method of application was notably different from that obtained from foliage application. Injuries described and illustrated include leaf chlorosis, dwarfing of leaves, minor distortion of leaves, discoloration of leaf veins, thickening of interveinal tissue, purple pigment in lower leaves, damage to the growing points, severe damage to the root systems and the development of club-like adventitious roots. Application of 2 lb./ac. 2,4-D during the seedling stage caused injury to the plants but no significant yield reductions. The 6 lb./ac. treatment at this stage caused severe damage and reduced yields. Application of 2 and 6 lb./ac. 2,4-D during the bloom stage caused leaf chlorosis, root damage and hastening of maturity. Yields were reduced by the 6 lb./ac. rate. No effect on the germination of seeds from treated plants was observed.—*Weed Abstr.*, **4**, No. 1827.

2712. Shorrock, R. W.
Peas and sprays.
Fmrs' Wkly, 1956, **44**(12): 95, 97, illus.
Recent experience shows that good weed control in peas can be got with ammonium DNBP [=dinoseb], alkanolamine DNBP or MCPB, but that the choice of material must depend on the variety of pea grown and the types of weed present. Dinoseb (ammonium) controls a wide range of weeds and is suitable mainly for drying pea varieties; high volume applications are needed. The alkanolamine salt is more selective and can be used even on delicate green varieties and at an earlier stage of growth; low volume sprays (40 gal. p.a.) are effective. MCPB kills hormone-sensitive weeds; it is safe on drying varieties but has not yet been adequately tested on all green varieties; low volume sprays (20 gal. p.a.) are effective.

2713. Warren, G. F.
Weed control in onions with CIPC.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, p. 71.
CIPC when applied to onions and weeds at 8–12 lb./ac. proved a valuable herbicide especially in combination with certain contact herbicides as a pre-emergence spray. Early post-emergence and later directed sprays of CIPC alone were effective in controlling many small weeds and gave excellent residual control.—*Weed Abstr.*, **4**, No. 1717.

2714. Alban, E. K.
Chemical weeding of onions.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 75-6.
Two years' work with CIPC on onions is described. A rate of 3–4 lb./ac. would seem to offer a good calculated risk in delayed post-emergence application. Satisfactory results were also obtained with 2-(1-chloropropyl)-N-3-(chlorophenyl) carbamate and 2-chloroethyl-N-(3-chlorophenyl)-carbamate at 3–4 lb./ac. as a post-emergence directed spray and at 6 lb./ac. as lay-by treatment. In these studies CIPC 6–8 lb./ac., CMU 2 lb./ac., ethyl xanthogen disulphide 5 lb./ac. and 24 lb./ac. PCP (sodium) also gave good commercial weed control when applied as lay-by treatments.—*Weed Abstr.*, **4**, No. 1720.

2715. Grigsby, B. H., and Ries, S. K.
Combinations of chemicals for weed control in onions.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 72-3.
CIPC at 8 lb./ac., CMU at 1 lb./ac. and Herbisan (xanthogen disulphide) at 10 lb./ac. as pre-emergence treatments gave satisfactory control without reducing stand or yield of onions. CMU at 2 lb./ac. caused yield reductions.—*Weed Abstr.*, **4**, No. 1718.

2716. Guzman, V. L., and Wolf, E. A.
Weeding lettuce and endive with CIPC in muck soil.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 344-8, bibl. 3.
CIPC at 10 lb./ac. or more, applied pre-emergence at a temperature of 68° F., after rolling the ground when the upper layer of soil was moist, gave commercial control of weeds in lettuce and endive. Some injury to endive occurred with rates of 12 lb./ac. or more. Pelletized CIPC at 10 lb./ac. and the liquid formulation at 6 lb./ac. applied before thinning appeared promising for post-emergence weeding of lettuce and endive.—*Weed Abstr.*, **4**, No. 1016.

2717. McWhorter, C. G., and Watson, W. W.
A progress report on the use of several herbicides for weed control in spinach.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 326-34.
Pre-emergence applications of dinoseb were hazardous to spinach when applied before planting. CMU, 3,4-DDU [=3-(3,4-dichlorophenyl-1,1-dimethyl urea] and certain heavy oils, applied pre-emergence, gave good weed control with little or no crop injury. Less promising treatments with 8 other materials are also described.—From *Weed Abstr.*, **4**, No. 1017.

2718. Ries, S. K., and Grigsby, B. H.
Post-emergence application of herbicides on tomatoes.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 79-80, bibl. 4.
The effect of 4 chemicals applied at transplanting and at fruit set on 2 varieties of tomato is reported. Sesin [=2,4-DEB] at 2 and 4 lb./ac. caused injury to tomatoes. Natrin [=2,4,5-TES] 2 lb./ac. at transplanting and 2 and 4 lb./ac. at fruit set and CMU 0·5 and 0·75 lb./ac. and 3,4-DDU 0·5 and 0·75 lb./ac. did not injure tomatoes.—*Weed Abstr.*, **4**, No. 1723.

2719. Guzman, V. L., and Wolf, E. A.
Weed control in peppers grown on organic soils.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 202-5, illus.

In experiments carried out for 3 years on the organic soils of the Florida Everglades area, Oktone [=octachlorocyclohexenone] at 8–12 lb./acre and 10% PCP, both in 30 gal. diesel oil per acre, gave the best pre-emergence weed control without affecting stand or yield of sweet peppers. Weed control with Oktone was improved by delaying application until 2 days before pepper seedlings emerged. Post-emergence spot treatment of grass weeds with dalapon showed promise. Spot treatments with Oktone in diesel oil and with herbicidal oils gave good weed control without injuring the peppers.—Everglades exp. Stat., Belle Glade.

Weed control in tobacco seed beds.

2720. Cibes, H. R., and Amy, A.
Control of weeds in tobacco seedbeds.
J. Agric. Univ. Puerto Rico, 1956, **40**: 85.

Among the chemicals used for the control of weeds in tobacco seedbeds Weedrench (allyl alcohol) proved the best. It is not only controlled weeds remarkably well, but seedlings were significantly more numerous than in the control beds or with other treatments; they also developed faster and were greener. The results suggest that Weedrench can be used as a drench at the rate of 1½ gal./100 gal. water per 1,000 sq. ft. of seedbed. The tobacco seed can be sown a week after the material is applied.

2721. Chappell, W. E., and Laprade, J. L.
Weed control—tobacco seed beds.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 213-16.

Methyl bromide at 1 lb. per 6 sq. yd. gave the most consistent results with no injury to plants in tobacco seed beds. Allyl alcohol at 0·75 pt. per 6 sq. yd. in spring or autumn also gave good weed control with little or no injury to plants. Cyanamide at 1·5 lb. per sq. yd. caused injury to tobacco under some conditions. Chlorobromopropene was not satisfactory except when combined with allyl alcohol.—*Weed Abstr.*, **4**, No. 968.

Weed control in tropical crops.

2722. Noonan, J. C.
Preliminary observations in the use of herbicides on crops.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 357-8.

Tomato. There was no noticeable herbicidal effect on tomatoes transplanted on plots pre-treated with dalapon and 2,4,5-T. Symptoms of amino-triazole toxicity were visible after plots had been turned. *Avocadoes and limes.* Dalapon 20 lb./ac.+amino-triazole 5 lb./ac. in 100 gal. water were effective for the control of para grass without damage to the trees. —*Weed Abstr.*, **4**, No. 1019.

2723. Medcalf, J. C., and others.
Experimental programs in Brazil. Agricultural chemicals.
[*Publ.*] *IBEC Res. Inst.*, 1955, pp. 44-56, illus.

Chemical weed control in coffee (pp. 53-6): Various chemicals were tested alone and in combination in 1954 for the control of weeds and grasses under 10-year-old coffee bushes. The most economical control was obtained with an activated oil-water emulsion (4 lb. PCP (sodium), 12 gal. diesel oil and 150 ml. Triton B1956 per 100 gal. water) applied at 20–100 gal. per acre when weed growth was young. Control of older growth can usually be achieved by adding TCA and/or 2,4-D to the emulsion. There are indications that only one or two blanket spray applications are necessary and that thereafter spot sprays will be adequate. *Bermuda grass control* (p. 56): In current experiments dalapon or TCA at 15 lb. per 100 gal. water per acre applied to uncut *Cynodon dactylon* are giving promising results. Another promising method is first to hoe the infested area and remove and burn as much as possible of the top growth, then to apply a spray containing 1 pt. dinitro-o-sec-butyl, 6 gal. diesel oil, 5 lb. TCA and water and emulsifier to make 50 gal. emulsion at 50 gal. per acre to the remaining roots, repeating the application if necessary. In unplanted land 40 lb. TCA per 100 gal. water per acre applied after discing gives good control. *Soil fumigation in coffee* (p. 56): In tolerance tests neither trees nor roots showed apparent damage when 20 or 40 gal. of 10 or 20% EDB per acre was injected at 8 in. depth at 12–30 in. from the tree, but D-D similarly applied at 100, 200 or 400 lb. per acre completely destroyed all the trees.

2724. Anon.
A new weedkiller for control of grasses.
Plant. Bull. R.R.I.M., 1956, No. 23, pp. 27-8.

In small-scale trials dalapon has proved more effective for grass control in rubber than the other weed killers commonly used in Malaya. Evidence suggests that effective control can be obtained by spraying with a solution at 15 lb. per acre twice a year in young rubber and once a year in mature rubber. The herbicide kills all the grasses commonly found in rubber in Malaya, including *Imperata*. No injury to rubber has been observed.

2725. Rochecouste, E.
Weed control.
A.R. Mauritius Sugar Ind. Res. Inst. 1955, 1956, pp. 59-67, illus.

Herbicide treatment of sugar cane fields to be replanted: When annual and perennial grasses formed the dominant vegetation 60 lb. TCA plus 40 lb. sodium chlorate per arpent* gave the best results, but very good control was also obtained with 30 lb. TCA plus 60 lb. sodium chlorate. When vegetation was dense the addition of a hormone weed killer did not increase the effectiveness of the mixture, but with a less dense cover the degree of re-infestation from seeds was relatively low when a hormone was added. The common practice of applying 60 lb. TCA plus 40 lb. sodium chlorate per arpent about 10 weeks before ploughing

* arpent=1·043 acres.

for planting is not entirely satisfactory when the field has a dense weed cover. Experiments show that with rotary hoeing a fortnight before spraying better control is achieved, that hormone increases the effect of this treatment and that satisfactory control is obtainable with 30–40 lb. TCA in the mixture. *Nutgrass:* Complete eradication of *Cyperus rotundus* was not obtained with either ammonium sulphamate or TCA, but fairly satisfactory control was achieved by repeated applications of the amines and esters of 2,4-D.

2726. Locsin, C. L., Tabayoyong, F. T., and Ferraris, I. P.
Chemical weed control (pre- and post-emergence) on the first ratoon of H37-1933.
Sugar News, 1955, **31**: 579-84.
Investigations were made at the Victorias Milling Company Experiment Station in 1954/55 on the use of Shell WK 60 Amine at 1 and 2 gal. per ha. and Weedone LV-4 at ½ and 1 gal. as pre- and post-emergence herbicides and on their residual effects on cane and sugar yields. Weedone LV-4 applied in early October and again in early December at ½ gal./ha. was the most economical treatment and gave satisfactory cane and sugar yields. Even at the higher rates neither herbicide controlled graminaceous and solanaceous weeds when applied post-emergence. Ratoon growth and tillering were not affected by the treatments.

2727. Guzman, V. L.
Herbicidal control of weeds in sugarcane on organic soils.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 203-6.
Post-emergence weed control with 21 lb. per acre TCA and 2·2 lb. per acre 2,4-D (applied twice) in a field of sugar cane heavily infested with grasses appeared economic owing to increased yields [see also *H.A.*, 26: 1660]. CMU gave control of *Parietaria numularia*.—*Weed Abstr.*, **4**, No. 965.

2728. Stamper, E. R., and Chilton, S. J. P.
Weed control in Louisiana sugarcane.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 207-10.
Yields of sugar cane were significantly increased by treatment with 2,4,5-TP, dalapon, 2,4-DEB, TCA, PDU, CMU, 3,4-DDU [=3-(3,4-dichlorophenyl)-1,1-dimethyl urea] and CIPC. Best results were obtained with pre-emergence applications of 11 lb. per acre TCA followed by post-emergence application of 5 lb. per acre 85% dalapon at the time the stubble cane was fertilized.—*Weed Abstr.*, **4**, No. 966.

2729. Loustalot, A. J., Muzik, T. J., and Cruzado, H. J.
Effect of CMU on sugarcane yields.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 211-12.
No significant increases in yield of sugar cane were obtained when 3 and 6 lb. per acre of CMU were applied. [For earlier work see *H.A.*, 25: 1586.] The yield was slightly reduced by a 9 lb. per acre rate.—*Weed Abstr.*, **4**, No. 967.

Herbicides and apparatus.

(*See also* 2415i, 2737b, e, n.)

2730. Matthews, L. J.
The volatility of weedkillers.
Proc. 8th N.Z. Weed Control Conf., 1955, pp. 119-22.
The problem of volatility of herbicides is discussed with reference to drift, foliage cover, soil application and effectiveness of low and high volatile preparations. CIPC was used successfully at 2 lb./acre in the South Island to eliminate *Spergula arvensis* in swedes but caused severe damage at 1 lb./acre in the North Island. The value of octochlorocyclohexenone as a herbicide lies in the fact that it is readily volatilized and can be used as a pre-emergence dressing in susceptible crops.—*Weed Abstr.*, **4**, No. 1902.

2731. Scott, M. A., and Struckmeyer, B. E.
Morphology and root anatomy of squash and cucumber seedlings treated with isopropyl N-(3-chlorophenyl) carbamate (CIPC).
Bot. Gaz., 1955, **117**: 37-45, bibl. 19, illus.
Squash and cucumber seeds were germinated in aqueous solutions of the herbicide CIPC at several concentrations. Little morphological or anatomical response was apparent in squash seedlings at concentrations of 1, 5, or 10 p.p.m. CIPC; at 15 p.p.m. secondary roots were shorter and radial elongation of the pericyclic and endodermal cells in the mature region of the roots was observed. Cucumber seedlings showed inhibition of shoot and root growth at all concentrations used. The region of elongation in the cucumber root was affected at 1 p.p.m. CIPC, and at 5 p.p.m. the region of maturation was affected. The pericyclic and endodermal cells in treated cucumber seedlings were radially elongated, and many of the cells in the meristematic region were hypertrophied. The most important effects of CIPC are the apparent inhibition of mitosis, the enlargement of cells, and the maturation of tissues near the root apex.—Univ. Wis., Madison.

2732. Dow Chemical Co.
Dalapon bulletin No. 2. Dalapon (sodium salt); a new plant growth regulator effective on grasses.
[*Publ.*] *Dow. chem. Co.*, Midland, Mich., 1953, pp. 20.
From the many favourable results obtained at various State and Federal experiment stations in the U.S.A. and reported in this bulletin it is concluded that dalapon is a promising new herbicide for the control of a number of grasses and certain other weeds. [For other papers on dalapon see *H.A.*, 25: 2760 and 3885; 26: 517 and 518 and several abstracts in this number of *H.A.*]

2733. (Carleton, R. M.)
Crabgrass killer.
Brooklyn bot. Gdn Rec., 1955–56, **11**: 283.
A new chemical, disodium-monomethyl-arsenate (Sodar), has given promising control of crabgrass (*Digitaria* spp.) and is also effective against *Stellaria media*, *Polygonum aviculare* and *Portulaca oleracea*. It has been used safely on bluegrasses, bentgrasses and fescues, and treated patches may be re-seeded 2–3 days after treatment.

2734. Holz, W., and Blaszyk, P.
Versuche zur Inaktivierung wuchsstoffhaltiger Herbizide durch Adsorption an Kohle. **(Research on the inactivation of selective herbicides by adsorption on charcoal.)**
Angew. Bot., 1956, **30**: 45-52, bibl. 4.
The authors experimented with Orth's method of coating seeds with activated carbon [see *H.A.*, 25: 476] to reduce the injurious effects of selective herbicides on crop plants. Utox-E and CIPC were applied to the soil before or after sowing with treated seeds of several crops. Weed control was satisfactory during the 3–4 weeks of the trials, but severe injury was caused by the herbicides to beans, spinach, onions and carrots; peas were unaffected.—Pflanzenschutzamt, Oldenburg.

2735. Edmond, D.
The selective spraying of herbicides.
Proc. 8th N.Z. Weed Control Conf., 1955, pp. 92-5.
A machine for selectively spraying tall weeds without damage to a shorter crop is described. It consists of fan type nozzles spraying backwards more or less parallel to the ground into a catching tray. The equipment shows promise but needs considerable testing and some modification.—From *Weed Abstr.*, **4**, No. 1906.

2736. Johnson, C. E.
Grower invents mechanical weeder.
Market Grs' J., 1956, **85**(3): 34, illus.
A tractor-mounted weeder consists of 4 cones, 2 for each row side, with flexible coil spring fingers, which rotate on the cones by friction with the soil. The coils are rigid enough to work the soil, yet flexible enough to avoid crop injury. The weeder has been used successfully with several vegetable crops and strawberries on sandy and loamy soils.

Noted.

2737.

a Aldrich, R. J.
Weed control in the U.S.
J. agric. Food Chem., 1956, **4**: 308-10, illus.
In vegetables, cranberries, strawberries and flowers.

b Anon.
New range of flame guns.
Comm. Gr, 1956, No. 3148, p. 702, illus.
For use in row crops on uneven ground.

c Banfield, G. L.
Weed control in drains.
Proc. 8th N.Z. Weed Control Conf., 1955, pp. 77-80.
By chemicals; see *Weed Abstr.*, **5**, No. 20.

d Buchholtz, K. P.
Some factors affecting the tolerance of peas to MCP and other growth regulating herbicides.
Weeds, N. York, 1954, **3**: 331-41, bibl. 15.
See *H.A.*, 25: 469 and *Weed Abstr.*, **4**, No. 1823.

e Crafts, A. S.
General-contact weed killers.
Circ. Calif. agric. Ext. Serv. **447**, 1955, pp. 16, illus.
Where, when and how to apply them.

f Crumpacker, J. D., and Larson, R. E.
Report of a study of brush control methods and equipment.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 97-9, bibl. 9.
See *Weed Abstr.*, **4**, No. 1734.

g Diehl, R.
Canadian thistle control.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, p. 132.
Cultural control of *Cirsium arvense*; see *Weed Abstr.*, **4**, No. 1799.

h Dybing, C. D., Fults, J. L., and Blouch, R. M.
Chlordane, chlorobromopropene, and hexachlorocyclopentadiene for pre-emergence control of crabgrass (*Digitaria sanguinalis* L.) and other annual grasses.
Weeds, N. York, 1954, **3**: 377-86, bibl. 12, illus.
See *Weed Abstr.*, **4**, No. 1828.

i Freeman, J. A.
Aquatic weeds.
Res. Rep. nat. Weed Cttee (west. Sect.) Canada, 1955, Regina, Sask., pp. 76-7.
Bulrushes, *Typha*, *Ranunculus* and *Juncus* spp.; see *Weed Abstr.*, **5**, No. 400.

j Gleason, L. S., and Loomis, W. E.
Basal sprays and injection treatments on trees.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 102-4.
See *Weed Abstr.*, **4**, No. 1736.

k Grigsby, B. H., Tsou, T. M., and Wilson, G. B.
Some effects of herbicides on growth and cytological processes.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 279-83, bibl. 2, illus.
Of peas; see *Weed Abstr.*, **4**, No. 983.

l Grigsby, B. H., Tsou, T. M., and Wilson, G. B.
Some effects of Alanap (NP) and Amizol on germinating peas.
Proc. 11th annu. Mtg N. centr. Weed Control Conf., 1954, pp. 88-90, bibl. 5.
Effects on mitosis; see *Weed Abstr.*, **4**. No. 1680.

m Hawthorn, L. R., Timmons, F. L., and Lee, W. O.
Promising herbicidal methods for the control of annual weeds in seed crops of onions.
Weeds, N. York, 1954, **3**: 345-50.
See *H.A.*, 25: 464 and *Weed Abstr.* **4**, No. 1824.

n HOLLY, K.
Penetration of chlorinated phenoxyacetic acids into leaves.
Ann. appl. Biol., 1956, **44**: 195-9, bibl. 3.
Rates of penetration of MCPA into pea and bean leaves were low.

o IVENS, G. W., AND COCHRANE, D. G.
Effects of 2,4,5-trichlorophenoxyacetic acid on evergreen thicket vegetation in Kenya.
Trop. Agriculture Trin., 1956, **33**: 136-44.
Control not obtained.

p MCCULLY, W. G.
Some factors influencing woody plant control obtained by the soil injection method.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 233-6, bibl. 2.
See *Weed Abstr.*, **4**, No. 973 and *H.A.*, 25: 1563 for earlier work.

q MCCURDY, E. V.
Broadleaved annual and biennial weeds.
Res. Rep. nat. Weed Cttee (west. Sect.) Canada, 1955, Regina, Sask., pp. 71-5.
Notes on control experiments with 14 spp.; see *Weed Abstr.*, **5**, No. 421.

r MEGGITT, W. F., ALDRICH, R. J., AND SHAW, W. C.
Factors affecting the herbicidal action of aqueous sprays of salts of 4,6-dinitro-ortho-secondary butyl phenol.
Weeds, N. York, 1956, **4**: 131-8, bibl. 16.
See *Weed Abstr.*, **5**, No. 436.

s PARRIS, C. G., AND RODGERS, E. G.
Weed control investigations on railroad rights-of-way.
Proc. 8th annu. Mtg south. Weed Conf., 1955, pp. 372-85.
See *H.A.*, 25: 1552 and *Weed Abstr.*, **4**, No. 1023.

t PETERSEN, H. I., AND RAVN, K.
Årsoversigt for Statens Ukrudtsforsøg 1954.
(Annual Report of the Danish Institute for Weed Research, 1954.) [English summary pp. 2.]
Tidsskr. Planteavl, 1955, **59**: 684-91.

u SHADBOLT, C. A., AND HOLM, L. G.
Some quantitative aspects of weed competition in vegetable crops.
Weeds, N. York, 1956, **4**: 111-23, bibl. 22.
See *H.A.*, 25: 458 and *Weed Abstr.*, **5**, No. 385.

VEGETABLES, TEMPERATE, TROPICAL AND GLASSHOUSE.

General.

(*See also* 2349, 2358, 2363, 2389, 2394, 2395, 2397, 2408, 2415a, x, 2416d, 2420, 2504k, 2703, 2734, 2737u, 2864g, v, w, 2865m, o, 2866b, c, m, 3209, 3218.)

2738. MASSACHUSETTS.
Department of Olericulture.
A.R. Mass. agric. Exp. Stat. 1953–1954, pp. 78-81.
Results of experiments summarized in this report include: *Onion sets* after storage at 86° F. for 5–9 weeks bolted significantly less than comparable sets kept at 32° F. throughout storage. *Weed control:* Karmex W [or CMU] was the most successful pre-emergence herbicide for asparagus beds; NPA was phytotoxic to some cucurbits; CIPC showed the most promise as a selective weed killer for beetroot. *Hail damage:* Only slight reductions in yield or quality of beans were observed after foliar or stalk damage of varying intensity caused by simulated hail during early vegetative growth; but light to moderate damage during and after flowering appreciably reduced yields and delayed maturity.

2739. ANDERSSEN, F. G.
Horticulture. [Forming part of the Annual Report of the Secretary for Agriculture, Union of S. Africa, for the year ended 31 August 1955.]
Fmg S. Afr., 1956, **31**: 84-7, 95.
Research covered the following: *Onions:* breeding, varieties, planting methods, spacing, time of sowing, setts. *Tomatoes:* breeding, varieties, training, diseases. *Beans (Phaseolus):* varieties, split seed. *Cucumbers:* pruning. *Peas:* breeding, varieties, irrigation, time of sowing. *Gladiolus:* manuring, fly control, weed control. *Fruit:* varieties, pests and diseases of peach, plum, strawberry and vine. *Roses:* pruning, black spot (*Actinonema rosae*) control. *Cucurbits:* germination, bitter substances. *Cabbages:* breeding.

2740. JANES, B. E., AND OTHERS.
A 14-year study of vegetable crop rotations on a Merrimac fine sandy loam soil in Connecticut.
Bull. Storrs agric. Exp. Stat. **319**, 1955, pp. 55, bibl. 34, illus.
Eight 4-year rotations were made concurrently with 10 vegetable and 3 green manure crops during each 4-year period; these rotations were repeated 3 times on the same plots. The most intensive rotation, i.e. 2 vegetable crops in one season without a green manure crop, produced the lowest yields. Some increase in yields of vegetables was obtained by incorporating a winter cover crop of rye every 2 years. Ploughing-in vetch in addition to rye resulted in still better yields. The highest yields were obtained when a winter cover crop was ploughed in every year and a summer crop of soyabeans was incorporated every fourth year. A crop of sweet corn followed by a winter cover crop of vetch had an inhibitory effect on the growth of lettuce or onions planted on the same land the following season [see also *H.A.*, 24: 3773 and 26: 542]. Beet seedlings also grew poorly in cool spring weather on plots which had grown sweet corn and vetch. After the seasonal temperature increased the toxic effect decreased, and N produced from vetch decomposition then stimulated the growth of the beets, and ultimately the highest yields were obtained from these plots. Soil organic matter was not greatly affected by the several rotations; under all rotations soil organic matter gradually declined.

2741. Heydecker, W.
Establishment of seedlings in the field. I. Influence of sowing depth on seedling emergence.
J. hort. Sci., 1956, **31**: 76-88, bibl. 16, illus.

A technique was developed for sowing seeds accurately at a range of pre-determined depths. Cabbage, lettuce, carrot and onion seeds were sown in a sandy loam at 18 depths, ranging from 0 to 95 mm., on 7 dates in spring and summer, 1953. Sowing date and sowing depth influenced emergence percentage significantly and independently. The effect of sowing on any particular date proved unpredictable, although a seasonal trend was apparent; more seedlings generally emerged from spring than from summer sowings. A range of optimal sowing depths was found for each kind of seed. Despite the heterogeneous nature of the types of seed used, all the optimal depth ranges overlapped over the range of 15–25 mm. (0·6–1·0 in.) for the seeds tested. The need for the provision of accurate depth adjustment in mechanical seed drills is stressed. [From author's summary. See also *H.A.*, 25: 502.]—Univ. Nottingham, Sutton Bonington.

2742. Cooke, G. W., and others.
Fertilizer placement for horticultural crops.
J. agric. Sci., 1956, **47**: 249-56, bibl. 4, illus.

Placement of complete fertilizer in bands 2 in. to the side of the seed gave higher yields of cabbages, lettuces, beetroots, onions, broad beans and runner beans than broadcasting. No consistent effect was observed on French bean yield. Placing fertilizer at a low rate (2·5 cwt./acre) gave higher yields than broadcasting at a high rate (5 cwt./acre). Fertilizer placement made most of the crops grow more rapidly in the early stages than broadcasting, and this often resulted in earlier maturity [see also *H.A.*, 25: 508]. In a small series of experiments with brussels sprouts and autumn-planted cabbages mid-season top-dressings of N applied broadcast by hand or as placed dressings had almost no effect on yield. Top-dressings broadcast in spring increased cabbage yields appreciably and to a greater extent than placement.—Rothamsted exp. Stat., and Luddington exp. Hort. Stat.

2743. Gusev, M. I., Zahrjapina, E. A., and Tertyčnaja, L. A.
Effective use of fertilizers. [Russian.]
Sad i Ogorod, 1956, No. 3, pp. 25-9.

A plea for the placement of fertilizers for vegetables is supported by many experimental results. One of the most efficient methods of using bacterial fertilizers is in nutrient pots. Cabbage plants raised in pots made of compost inoculated with various "bacterins" produced from 21 to 35% higher yields than those raised in pots of untreated compost. Tomatoes are stated to react to the bacterial fertilizers in a similar manner.

2744. Campbell, J. D.
Differential cation absorption and yield response by vegetable crops grown at various levels of calcium, potassium, and sodium.
Diss. Abstr., 1955, **15**: 1961-2, being *Publ.* 12139 of 171 pp.

The application of Ca increased yields of 5 crops but did not affect Ca composition; both yield and K percentage were increased in spinach. Ca applications also increased Ca percentage in squash vines and tomato fruits, K percentage in cauliflower, snap beans, carrots and sweet corn, and generally increased Na percentage in pea, lima bean, sweet corn and cucumber plants. Applications of K increased yields of spinach and decreased those of onions and cauliflowers, but increased K and decreased Na percentages in all 3 crops. In addition K applications decreased Ca concentrations in lima beans, celery, carrots and peas, and decreased Na concentration in 10 crops, but increased it in cucumber; K applications increased K percentages in all the 17 crops tested. The Ca percentage of beets, celery and carrots fell after Na application, which also decreased K percentages in beets and musk-melon and increased the Na concentration in all crops except potato haulms. In general K application was found to have the strongest influence on plant contents of the 3 cations. Application of Ca with K at certain levels resulted in significant yield increases, which were associated with a reduction in the Na percentage in the plant. Beets and celery accumulated relatively large quantities of Na with no apparent injury, and this frequently had a favourable effect on yield when K was low; cauliflowers and spinach also accumulated relatively large concentrations of Na without showing injury, but in muskmelons, carrots, cabbages, tomatoes and cucumbers the accumulation of Na was associated with lower yields. Among vegetables which tended partially to exclude Na, lettuces, peas and lima beans were not injured by Na application, but in onions, squash, potatoes, sweet corn and snap beans some injury did occur.

2745. Fiskel, J. G. A., and Westgate, P. J.
Copper availability in high copper soils.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 192-7, bibl. 19.

In Florida sandy soils with 1 lb. available Cu per acre, several crops showed copper-induced Fe chlorosis. The level of water-extractable Cu increased from about 0·1 lb. per acre for soil used for celery production for 25 years or less to several tenths of a pound on land used for 35 years or more. Crop productivity on these older areas has declined.—Fla agric. Exp. Stat., Gainesville, and Centr. Fla Exp. Stat., Sanford.

2746. Nelson, L. G., Berger, K. C., and Andries, H. J.
Copper requirements and deficiency symptoms of a number of field and vegetable crops.
Proc. Soil Sci. Soc. Amer., 1956, **20**: 69-72, bibl. 5, illus.

Several field and vegetable crops were grown in the field and greenhouse in a peat soil which was very deficient in copper. In a field trial beetroot yields were increased from 3,700 lb. to over 18,000 lb. by the application of 25 lb. CuO per acre. Yield response of cabbages, carrots and onions was rather lower, but growth differences due to Cu fertilization were marked. In a greenhouse experiment the Cu contents of tobacco and lettuce with or without Cu fertilization were high, but were further increased by Cu fertilization. In peas the Cu content of the vines was slightly lower when Cu was applied, but in the pods Cu increased from 4 to 13·9 p.p.m. In a further field trial with 14 crops increases in Cu content were observed in almost every case following the application of CuO. Leaves generally contained more Cu than did roots.

2747. Wolde, W.
Der Einfluss der Untergrundbewässerung auf die Entwicklung verschiedener Gemüsearten. (The effect of subirrigation on the development of certain vegetables.)
Dtsch. Gartenb., 1956, 3: 91-3, bibl. 13.

The data published here for the period 1952-55 refer to kohlrabi, red cabbages, brussels sprouts, dwarf beans, tomatoes, carrots, lettuces, spinach and celeriac grown in a sandy loam. The irrigation water was supplied through 3 cm.-wide, porous bitumen pipes laid 40 cm. deep and 1·5 m. apart. In the dry season of 1952 the increase in yield due to irrigation amounted to 300–400%, while in other years the difference between irrigated plots and controls was less striking though still considerable. The drawback of subirrigation at present is the high initial outlay. The effect of trace elements and NPK in addition to irrigation was also briefly studied.—Martin-Luther Univ., Halle-Wittenberg.

2748. Emmert, E. M.
Polyethylene mulch looks good for early vegetables.
Market Grs J., 1956, **85**(5): 18-19, illus.

Strips of black plastic 1½ mm. thick and 3 ft. wide have been used successfully as a mulch for early vegetables in tests at the Kentucky Agricultural Experiment Station, Lexington. The strips were laid 2 ft. 8 in. apart over the irrigation furrows, T-shaped slits being made in the plastic at the bottom of the furrows to allow water penetration. Seed was sown through the plastic with a corn jobber [dibber?] and plants could easily be set through slits in the material. The mulch gave almost perfect control of weeds, conserved moisture and raised soil temperature by as much as 10° F. Mulched crops were earlier than the controls, and beans, melons and unstaked tomatoes were cleaner. To prevent the soil becoming too hot in midsummer, aluminium-pigmented polyethylene can be used, which reflects the light. The plastic can be walked on without damage and will last for 4 years.

2749. (Emmert, E. M.)
Extra early vegetables produced with plastic row covering.
Market Grs' J., 1956, **85**(4): 40, illus.

Early vegetables have been protected by covering the rows with 54-inch wide plastic 0·0015 or 0·002 inches thick. The plastic is supported by wires shaped like croquet hoops, and kept in place by covering the edges with soil. The covering can protect crops from temperatures as low as 25° F.—Ky agric. Exp. Stat., Lexington.

2750. Wallen, V. R., and Bell, W.
Treatment of vegetable seed for improved emergence—1955.
Plant Dis. Reptr, 1956, **40**: 129-32, bibl. 3.

In continuation of earlier work [see *H.A.*, 24: 421; 25: 499 and 25: 2805] 7 dressings were tested in 1955 on 24 kinds of vegetable seeds, most of them 1 year old. Captan 50W (50% captan) was the best general fungicide, but Phygon and Spergon were the best for peas. Over the 3–4 years' tests peas, beets, swiss chard, cucumbers, pumpkins, squash and marrow responded to seed treatment each year, whereas, at the opposite extreme, asparagus never showed any response.—Canada Dep. Agric., Ottawa.

2751. Reddy, B. R., and Nettles, V. F.
The germination of some crop seeds as affected by two soil fumigants under laboratory conditions.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 208-13, bibl. 4.

Germination of a number of vegetable seeds was inhibited by the presence of fumigant vapours, a dichloropropene-dichloropropane mixture being more injurious than ethylene dibromide. Fumigant vapours were more toxic to the germinating seeds than was water exposed to the fumigants. Such water absorbed large amounts of the chemicals, but the resultant lower pH probably did not cause reduced seed germination. Fumigant toxicity increased with a rise in humidity or temperature.—Fla agric. Exp. Stat., Gainesville.

2752. Kerr, A.
Some interactions between plant roots and pathogenic soil fungi.
Aust. J. biol. Sci., 1956, **9**: 45-52, bibl. 16, illus.

A "cellophane" bag technique is described which enables some chemical interactions between organisms to be studied *in situ*. By using this technique it was shown that *Pellicularia filamentosa* and *Sclerotina homeocarpa* excrete substances toxic to radish, lettuce, beetroot, tomato and bean plants. The roots of lettuce and radish seedlings stimulated the growth of *P. filamentosa*, but the roots of tomato seedlings did not. Preliminary investigations on the relation of the root excretions to the infection and susceptibility of seedlings are described.—Waite agric. Res. Inst., Univ. Adelaide.

2753. Overman, A. J., and Burgis, D. S.
Allyl alcohol as a soil fungicide.
From abstr. in *Phytopathology*, 1956, **46**: 22.

In several years' trials drenches of 25 gal. allyl alcohol (AA) in 5,500 gal. of water per acre were effective in controlling *Pellicularia* spp., *Pythium* spp. and *Fusarium* spp. in vegetable seedbeds on fine sand, without injuring the crops. The effectiveness of the treatment appears to be due to its stimulation of the activity of *Trichoderma* spp.

2754. Marlatt, R. B.
Susceptibility of some vegetables to streptomycin injury.
Plant Dis. Reptr, 1956, **40**: 200-1, bibl. 2.

In greenhouse tests on 14 vegetables celery and radish were very susceptible, and peas, peppers and watermelons very tolerant to streptomycin.—Ariz. agric. Exp. Stat., Mesa.

2755. Gray, R. A.
Increasing the absorption of streptomycin by leaves and flowers with glycerol.
Phytopathology, 1956, **46**: 105-11, bibl. 15, illus.

Glycerol was found to be an excellent agent for increasing the absorption of streptomycin by the leaves of bean, tomato, pepper and tobacco plants. It greatly increased the effectiveness of streptomycin sprays in controlling common bacterial blight of beans (*Xantho-*

monas phaseoli) in greenhouse plants. This increase in effectiveness was correlated with an increase in absorption of the antibiotic by the leaves. [From author's summary. See also *H.A.*, 25: 3958.]—Merck & Co., Rahway, N.J.

2756. Wilson, J. D.
Control of root-knot on carrot, celery, and onion in muck soil by EDB and D-D.
From abstr. in *Phytopathology*, 1956, **46**: 31.

Spring applications of EDB or D-D gave negligible control of the root-knot nematode, *Meloidogyne hapla*, on carrots growing on muck soil. Autumn applications increased the yields of carrots and celery but not of onions.

2757. van den Bruel, W. E., and Moens, R.
Une méthode de lutte efficace, utilisable en plein champ contre les limaces. (**A method of slug control for use in the field.**) [Flemish and English summaries ¼ p. each.]
Parasitica, 1956, **12**: 8-15, bibl. 2.

Calcium cyanamide gave the most promising slug control in a series of tests. *Agriolimax reticulatus* was killed after contact with soils treated with 265 lb./acre of cyanamide. Soil toxicity persists for about 7 days in dry weather and about 5 days in wet weather. The material is quite safe to use on grass but it may cause damage to some dicotyledonous plants.—Stat. ent. État, Gembloux.

2758. Ferguson, W., Lyall, L. H., and Jasmin, J. J.
Effect of maleic hydrazide on vegetable storage.
Progr. Rep. hort. Div., centr. exp. Fm, Ottawa, 1949-53, 1955, pp. 159-60, bibl. 2.

The use of MH on onions reduced the number of sprouted bulbs but increased rots in stored bulbs. Less sprouting in Yellow Globe Danvers No. 11 and in Sweet Spanish (Riverside) varieties resulted from spraying about 2 weeks before the plants started to mature than from spraying at the start of maturation. The keeping quality of spinach was improved by spraying with MH-40 at 7,500 p.p.m. 8 days before harvest. Elongation of asparagus spears treated after harvest decreased with increased MH concentration. Spears treated with 5,000 or 10,000 p.p.m. MH had significantly less fibre than the controls.

2759. Allen, A. S.
"Mylar" polyester film offers special features for food packaging.
Agric. Newsl., 1956, **24**: 26-9, illus.

"Mylar" is a very tough plastic film which looks like cellophane. Pre-trimmed vegetables can be sold, and later cooked, in the plastic package. It has also been used for apple and pear packages.

Artichokes.

2760. Bervillé, P., and Lherault, P.
Un oïdium parasite de l'artichaut, dans le Languedoc. (**A powdery mildew parasitic on artichoke in Languedoc.**)
Rev. hort. Paris, 1956, **128**: 1422-3, illus.

Yellowing of basal leaves of globe artichoke, which later become brown and necrotic, was found to be due to attack by *Leveillula taurica*. The development of the fungus was favoured by mild and humid conditions in autumn and spring. Copper sprays were effective against it, but the artichoke plants were sensitive to high rates of Cu applied under humid conditions.

2761. Thermes, R., and Cessac, M.
Cnephasia Wahlbomiana L., une tordeuse observée en 1953 sur les artichauts dans le Roussillon. (***Cnephasia wahlbomiana*, a tortrix moth observed on globe artichokes in Roussillon in 1953.**)
Reprinted from *Rev. Zool. agric. appl.*, 1955, nos. 1-3, pp. 3.

In preliminary experiments effective control of *Cnephasia wahlbomiana* caterpillars on globe artichokes was obtained without injury to the flower heads by spraying with DDT in oil emulsion at 60 g. active ingredient per hl., provided the treatment was applied in early April at least a fortnight before harvesting.

Brassicas.

(*See also* 2361, 2372, 2375, 2415u, 2707-2709, 2864k, 2865s, 2866g, t.)

2762. Ratvik, H., and Narvestad, K.
Rasjonalisering av tiltrekkingsarbeidet med kål I. Forenkling av arbeidsgangen. (**Labour efficiency in cabbage and cauliflower cultivation. I. The simplification of operations.**)
Gartneryrket, 1956, **46**: 154-8, illus.

An analysis of labour requirements and cultural operations throughout the season is discussed with suggestions for economies.

2763. Ratvik, H., and Narvestad, K.
Arbeidsundersøkelser ved tiltrekking av kålplantar. (**Labour studies on the raising of cabbage plants.**)
Gartneryrket, 1956, **46**: 242-50, illus.

Soil preparation, sowing, pricking out and transplanting into pots were among the operations studied. A discussion of implements and benches is supported by photographs and drawings. [See also *H.A.*, 25: 543.]

2764. Tatebe, T.
Studies on the self-incompatibility of the common cabbage. II. An inhibiting substance. [Japanese, with English summary ⅓ p.]
J. hort. Ass. Japan, 1955, **24**: 168-74, bibl. 23.

Pollination studies made on buds and open flowers of cabbages indicated that the substance inhibiting self-fertilization is mainly secreted in the stigma, and that it is produced much more abundantly at the open flower stage than at the bud stage.

2765. Southern Cooperative Group. (Speirs, M., and others.)
Influence of environment on the chemical composition of plants. 2. Variations in the composition of turnip greens with location, season, and concomitant environment.
South. Coop. Ser. Bull. **42**, 1955, pp. 123, bibl. 57.

The first bulletin in this series [see *H.A.*, 25: 1203] reviewed the literature on the subject. In this second bulletin data are presented from a comprehensive project started in 1947 by 5 Agricultural Experiment Stations (Ga, N.C., Okla, P.R. and Tex.), the U.S. Plant, Soil and Nutrition Laboratory, U.S. Dep. Agric., Ithaca, N.Y., and the Weather Bureau, U.S. Dep. Commerce. Measurements of air and soil climate were made at each location, and data are tabulated on plant growth and contents of moisture, vitamins, Ca, P, Mg, Na, K, Fe, total N, ether extract and crude fibre from field plantings and sand cultures of turnip greens. A more detailed appraisal and analysis of the data will be presented in the final report of this series.

2766. Eheart, J. F., and others.
Crop, light intensity, soil pH, and minor element effects on the yield and vitamin content of turnip greens.
Reprinted from *Food Res.*, 1955, **20**: 575-81, bibl. 22.

Yield was highest in high-pH plots and in the plots that received soil applications of minor elements. Dry matter content increased and carotene content decreased with high light intensity. Thiamine content increased slightly when minor elements were applied to the soil and increased considerably with a combination of high light intensity and low soil pH. Riboflavin content increased to a small degree with high light intensity and more with a combination of high light intensity and minor elements applied to the soil.

2767. Army, T. J., and Miller, E. V.
The interaction of kind of soil colloid, fertility status, and seasonal weather variation on the cation content of turnip leaves.
Proc. Soil Sci. Soc. Amer., 1956, **20**: 57-9, bibl. 8.

In a study of the effect of environmental factors on cation content of turnip greens, seasonal weather variations from spring to autumn were as important as soil and fertilizer factors. The divalent cation content of the leaves was greater in spring than in autumn, whereas the monovalent cation content was significantly higher in autumn than in spring. The magnitude of seasonal effects on cation concentration was related to the type of clay mineral predominating in the soil, and to the percentage soil saturation with Ca and Mg.—N.C. agric. Exp. Stat.

2768. Natti, J. J., Hervey, G. E. R., and Sayre, C. B.
Factors contributing to the increase of downy mildew of broccoli in New York State and its control with fungicides and agrimycin.
Plant Dis. Reptr, 1956, **40**: 118-24.

The possibility of controlling *Peronospora parasitica* on the susceptible Waltham 29 variety of broccoli by the addition of fungicides to the regular insecticidal sprays was investigated. Agrimycin 100 at 1·0 lb. and Spergon SL (98% chloranil) at 3·0 lb. per acre were the most promising materials tested. Applied 4 times between early September and early October they reduced the number of mildew lesions per leaf to 14 and 15 respectively when applied at 25 gal. per acre, and to 15 and 17 respectively when applied at 100 gal. compared with 32 lesions in the control. Downy mildew was less severe in late-maturing varieties than in early. The incidence in plots sprayed with emulsifiable insecticide formulations containing a solvent and a wetting agent was significantly greater than in plots sprayed with an insecticide containing no solvent or wetting agent or than in plots left.—N.Y. St. agric. Exp. Stat., Geneva.

2769. de Fluiter, H. J.
Ervaringen omtrent de bestrijding van de melige koolluis (*Brevicoryne brassicae* L.) in spruitkool in 1954 rn 1955. **(Experience in the control of the mealy cabbage aphis on sprouts in 1954 and 1955.)**
Tijdschr. PlZiekt., 1956, **62**: 22.

Sprays of metasystox, 2030/20, endrin, parathion, malathion and diazinon were applied at the beginning of August 1955, and again about the end of August to brussel sprout plants. All treatments except endrin reduced the aphid populations. The percentages of clean sprouts from the metasystox- and diazinon-sprayed plants were significantly higher than those from the controls.—Inst. PlZiekt. Onderz., Wageningen.

2770. Lein, H.
Kålfluene. Undersøkelser over deres biologi og bekjemping i Norge. **(Cabbage root flies, their biology and control in Norway.)** [English summary pp. 4.]
Meld. Stat. Plantevern **9**, 1955, pp. 65, bibl. 19, illus.

In Norway *Hylemyia brassicae* and *H. floralis* are the most serious pests of cabbage, swede and turnip. Their control has been studied since 1942 by the Entomology Division of the Norwegian Plant Protection Institute. The bulletin gives an account of the whole series of experiments since its initiation but concentrates on the later phase, 1951–53, when synthetic insecticides were tested extensively. Both watering cabbage plants two days after egg laying with emulsions of chlordane or lindane at specified concentrations at the rate of 0·1 l. per plant and placing chlordane dust around the plants at the rate of 3 g. per plant reduced infestation and increased yields by 16–31%. Increases in yield of a similar order were obtained by incorporating chlordane, lindane or dieldrin dust in the soil pots in which the seedlings were raised. Dipping the roots in a slurry of clay and 40% chlordane or 15% dieldrin emulsions at a concentration of 0·5% gave variable, but generally beneficial, results. Lindane emulsion proved too phytotoxic, but the addition of lindane dust to a slurry was satisfactory.

2771. Hellqvist, H.
Bekämpningförsök mot kålflugans och morotflugans larver. **(Experiments on the control of cabbage root fly and carrot fly larvae.)**
Växtskyddsnotiser, 1955, No. 1, pp. 4-14, illus.

The paper is a progress report on work carried out by the Swedish Plant Protection Institute [see *H.A.*, 24: 1544 and 25: 623]. Watering cabbage and cauliflower plants twice with solutions of several proprietary insecticides continued to give satisfactory control of *Hylemyia floralis*, and preliminary experiments, in

which the roots were dipped in a slurry of aldrin emulsion and clay, also gave promising results. The trials on carrot fly control are still in a preliminary stage, but several methods of treating the seed and the soil with BHC preparations have given promising results.

2772. Wheatley, G. A.
Dust insecticides for the control of the imported cabbage worm.
Bull. Conn. agric. Exp. Stat. **590**, 1955, pp. 15, bibl. 9, illus.

The use of alternative insecticides or combinations of insecticides is considered as a possible method of combatting the development of acquired resistance to insecticides by the larvae of *Pieris rapae*. There is evidence that the pest has already become appreciably tolerant to DDT in Connecticut, although the material still gives adequate control. Endrin and dilan were very potent, whereas dieldrin, isodrin and toxaphene were not very effective. Dilan appeared to induce cabbage aphid infestation. Observations on the life cycle and habits of *Pieris rapae* are recorded. A description is given of a compressed air operated hand duster which can be used to apply small quantities of dust to experimental plots.

2773. Endrigkeit, A.
Kopfkohl-Einlagerungsprobleme. **(The storage of cabbage.)**
Gesunde Pfln, 1955, **7**: 266-9, from abstr. in *Z. PflKrankh.*, 1956, **63**: 255.

Camps with a wide range allowing for ventilation proved most suitable for storing cabbage. Without fungicidal treatment, however, it was not possible to keep losses from rots below 20%. Of 6 chemicals tested the chloronitrobenzol preparation Brassicol afforded the best protection, lasting about 3 months in clamps and longer in barns.

Celery and celeriac.

(*See also* 2745, 2866p.)

2774. Böhm, O.
Beitrag zur Kenntnis einer durch Nematoden hervorgerufenen Krankheit der Sellerie. **(Damage to celeriac caused by nematodes.)** [English summary ½ p.]
PflSch. Ber. Wien, 1956, **16**: 1-20, bibl. 41, illus.

In Austria free-living parasitic nematodes caused a root rot and stunted growth in celeriac. Other plants affected on celeriac-sick soil were roses and *Spiraea*. Seasonal outbreaks of the nematodes reach a maximum in early summer and a minimum in winter and early spring. Fumigation with DD (1,000 l./ha), soil sterilization and crop rotation were effective in controlling the soil sickness.

2775. Schindler, H.
Beitrag zur Nematoden-Bekämpfung bei Sellerie. **(Report on nematode control in celeriac.)** [English, French and Spanish summaries 6 lines each.]
Mitt. Klosterneuburg, Ser. B, 1956, **6**: 1-6, bibl. 5, illus.

Soil sterilizations with steam, 0·5% Ekatox (a phosphoric acid ester), DD and chloropicrin were compared, and their effect on the subsequent crop of celeriac was observed. Treatment with steam involved high labour costs but had an excellent effect on yields. Chloropicrin gave the best nematode control but it is also expensive and is toxic to mammals. DD gave good control of nematodes but must be applied some time before sowing the crop. Ekatox only reduced nematode populations for a time.—Wien Schönbrunn.

2776. Truscott, J. H. L.
Storage root rot of celery caused by *Ansatospora macrospora* (Osterw.) Newhall.
Bienn. Rep. hort. Exp. Stat. Prod. Lab. [Vineland] for 1953 and 1954, pp. 122-7, bibl. 2, illus.

Storage root rot of celery was found in epidemic proportions in celery grown in mineral soil in the Burlington area, Ontario. There is evidence that some infection occurs in the field. Post-harvest infection can be largely controlled by dipping the trimmed butts in a 2% suspension of copper 8-quinolinolate during the harvest-packing operations. Surface treatment of the butt is ineffective if the fungus has already penetrated the tissues.

Cucurbits.

(*See also* 2350, 2359, 2361, 2406, 2659, 2731, 2835, 2864r, 2865k, t, x, y, 2866e, i, t, 3122.)

2777. Anon.
Komkommerrassenproeven. **(Cucumber variety trials.)**
Med. Proefst. Groent. Fruit. Glas Naaldwijk, March 1956, p. 2.

In trials comparing 3 new *Cladosporium*-resistant cucumber varieties, Esvier, T2 and Amato, with older varieties, yields of the new varieties were generally slightly below those of the older ones, but Esvier was of outstanding quality and produced 43% more grade A cucumbers than did the older varieties.

2778. Naugoljnyh, V. N.
Changing the sex characters in cucumbers to increase their productivity. [Russian.]
Bot. Žurnal, 1955, **40**: 715-19, bibl. 14.

In small scale experiments cucumber plants from seeds treated with 0·03% solution of methylene blue for 24 hr. at 22–25° C. produced 62% more pistillate flowers and 45% more fruits which were also heavier than the controls. Total yield was increased by 85%. Similar results were obtained in field trials, the effect of the treatment being more marked in cool seasons, indicating that the treated plants had improved cold resistance.

2779. Rada, B. F.
The use of the bacterial fertilizer AMB in frames. [Russian.]
Sad i Ogorod, 1956, No. 3, pp. 34-5.

Instructions are given on the preparation of the fertilizer which consists of peat, lime and AMB culture. [The composition of the AMB bacterial culture is, as usual, not stated, but it presumably conforms to the general principles discussed in *H.A.*, 24: 1123.—Ed.]

Pumpkins in frames receiving superphosphate alone produced 28% lower yields and later maturing crops than those receiving both superphosphate and AMB fertilizer, the latter being applied at 200 g. per plant. The bacterial fertilizer applied to cucumbers produced similar results.

2780. Kristoffersen, T.
Forsøk med kunstig lys til agurk. (Trials with artificial light for cucumbers.)
Gartneryrket, 1956, **46**: 115-23, illus.

Artificial illumination of glasshouse cucumbers increased yields during the first 5–6 weeks of harvesting by nearly 200% and total yields by over 50% at the cost of about 1 kr. per plant. The provision of continuous light from fluorescent tubes at the rate of 200–300 watts per sq. m. is recommended for about 35 days from germination. Suggestions are made for the arrangement of the tubes, and full experimental data are presented.—Agric. Coll. of Norway.

2781. van Raalte, M. H., and others.
Investigations on plant chemotherapy.
Reprinted from *Meded. LandbHogesch. Gent*, 1955, **20**: 543-55, bibl. 12, illus., as *Meded. Lab. Phytopath.* **153**.

Certain compounds when applied to roots of cucumber plants reduced the susceptibility of the tops of *Cladosporium cucumerinum*. A method of estimating this effect quantitatively is described. The activity of one of these compounds, S-(carboxymethyl)-N,N-dimethyldithiocarbamate (G33), was investigated, and the compound was shown to be a weak growth substance. Another compound, S-(2-carboxypropyl-2)-N,N-dimethyldithiocarbamate, was inactive as a growth substance, but had the same systemic effect on *Cladosporium* infection. Both compounds were phytotoxic at concentrations above 500 mg./l. Protective action has also been obtained against *Cladosporium fulvum* in tomatoes and *Mycosphaerella pinodes* in pea.

2782. Zanardi, D.
Efficacia del Karathane nella lotta contro l'oidio degli zucchini (*Erysiphe cichoraceaarum* D.C.). (Efficacy of Karathane against marrow mildew, *Erysiphe cichoracearum*.)
[English summary 7 lines.]
Riv. Ortoflorofruttic. ital., 1956, **40**: 82-6, bibl. 1, illus.

In northern Italy mildew causes an annual midseason break in the culture of marrows. In experiments in Voghera 0·1% Karathane applied weekly from early June to early September gave complete control of the disease and permitted continuous cropping throughout the season without re-sowing.—Osserv. Mal. Piante, Pavia.

2783. Sowell, G., Jr.
Etiology and control of soil rot of cucumber.
From abstr. in *Phytopathology*, 1956, **46**: 27.

Soil rot of cucumbers, apparently due to *Rhizoctonia solani*, was significantly reduced by: (1) a pre-emergence drench containing 25 lb. pentachloronitrobenzene per acre, followed by a drench containing 30 lb. captan per acre; or (2) a neutral copper drench at 60 lb. per acre, followed by weekly applications of the same materials as a foliage spray at 4 lb. per 100 gal.; or (3) captan applied as a drench at 30 lb. per acre or as weekly foliage applications of 1 lb. per 100 gal. All drenches containing captan or copper were applied when the plants were 25 cm. tall.

2784. Hepburn, G. A.
Control of pumpkin flies.
Fmg S. Afr., 1956, **31**: 14, bibl. 3, illus.

A bait spray of parathion and sugar in water has been found to control *Dacus ciliatus* and *Dacus bivittatus cucumarius* on cucurbits. The spray should be applied in coarse droplets to the foliage from the start of flowering, and thereafter at weekly intervals and after rain.

2785. Hoover, M. W.
Preliminary studies relating to the effect of maturity and storage treatments upon the quality of cantaloupes.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 185-8, bibl. 1.

Smith's Perfect cantaloupes were harvested at 3 stages of maturity and stored for 0–12 days at different temperatures. The quality of cantaloupes stored at 40° F. remained approximately the same during 12 days of storage. During storage at 55° F. fruit quality improved. Fruits harvested at the one-half slip and full-slip green stage of development and stored at 70° F. ripened to optimum quality in 3-6 days. Those harvested at the non-slip stage and stored at 70° F. reached optimum quality after about 6 days. The quality of cantaloupes harvested at the non-slip stage of maturity and ripened in storage never reached that of fruits harvested at later stages of maturity.—Agric. Exp. Stat., Gainesville.

Legumes.

(*See also* 2359, 2361, 2365, 2370-2374, 2381, 2383, 2388, 2406, 2415d, w, 2658, 2710-2712, 2737d, l, n, 2781, 2864c, j, q, y, 2865f, w, z, 2866s.)

2786. Nada, I. A. A., and Rafaat, A.
Carbohydrate changes during germination of *Vicia faba* seeds.
Indian J. agric. Sci., 1955 (issued 1956), **25**: 271-80, bibl. 12.

Vicia faba seeds were sown in pots and samples of the seedlings were analysed during and after germination. In the cotyledons sucrose was an important constituent of the soluble carbohydrate content. Fermentable polysaccharides showed an increase on the fourth day after germination, but the content of non-fermentable polysaccharides was very low. In the shoots maximum translocation and accumulation of sucrose occurred when sucrose was at its highest concentration in the cotyledons. Roots accumulated sugar rapidly during the first stage of germination. Reducing sugars were more important than sucrose in root metabolism.—Cairo Univ.

2787. Nada, I. A. A., and Rafaat, A.
Growth and carbohydrate changes during formation of *Vicia faba* seeds and fruits.
Indian J. agric. Sci., 1955 (issued 1956), **25**: 281-92, bibl. 10.

Pods from *Vicia faba* were collected and analysed at 15-day intervals, starting 15 days after setting. Carbo-

hydrates were continuously accumulated and stored in the cotyledons, sucrose being the principal sugar present. Carbohydrates increased in the testas at first, but later starch and sugar contents were reduced. A similar rise to a maximum of carbohydrate accumulation followed by a decrease was observed during the growth and development of the pericarp. In the whole pod sugars increased to a maximum and then decreased, while fermentable polysaccharides showed a continuous increase.—Cairo Univ.

2788. Inoue, Y., and Shibuya, M.
Studies on the reproductive physiology of common beans, *Phaseolus vulgaris* L.V. The effects of seed-sowing dates on the length of pods, the number of ovules, the number of seeds per pod and other pod characters. [Japanese, with English summary ½ p.]
J. hort. Ass. Japan, 1956, **24**: 240-4, bibl. 16.

Masterpiece dwarf beans were sown twice a month from mid-April to the end of August. The results were: (1) Pod length was greatest in the mid-April sowing, decreased until the mid-July sowing (57% of the mid-April length) and then increased, the end of August length being 75% of the mid-April length. (2) The number of ovules per pod followed the same course. (3) The number of seeds per pod was similarly related to sowing date, but the minimum resulted from the end of July sowing, and the mid-August and late August numbers were only 29% and 36% of the mid-April number. (4) The weight of seeds per pod followed the same course as the number of seeds, but the lowest weight, that produced by the end of July sowing, was only 10% of that produced by the mid-April sowing. (5) The number of pods per plant was greater in the 2nd, 3rd and 4th sowings than in the first, decreased after mid-June and increased in August. The causes of these trends are discussed.

2789. Somos, A.
Étkezési borsófajtákkal végzett tenyészterületvizsgálatok eredményei. **(Spacing trials with garden pea varieties.)** [Russian and German summaries 1¼ pp. each.]
Agrártud. Egy., 1951 (issued 1953), **15**(2, part 1): 3-31, bibl. 6.

In trials with 4 varieties of pea, ranging from 50 to 160 cm. in height, the highest yields were nearly always obtained from a spacing of 25×3·5 cm. Sowing in groups of 6 seeds at 25×25 cm. gave the next best results.

2790. Krasnikov, B. V., and Dolgih, S. T.
The effect of varietal characteristics of nodule formation in legumes on subsequent crops. [Russian.]
Agrobiologija, 1955, No. 6, pp. 102-11, illus.

Figures are given showing great differences in nodule formation on the roots of different varieties of peas and beans (both *Phaseolus* and *Vicia*). The degree of nodulation was positively correlated with productivity and N content of both plant and soil. In sand culture experiments and field trials it was found that lettuce grown after pea and bean (*Phaseolus*) varieties with good nodule-forming properties produced greater yields than when grown after varieties which do not nodulate so readily.

2791. Rudin, P. E.
Versuche zur Physiologie der Knöllchenbildung bei *Pisum sativum* L. **(Research on the physiology of nodule formation in *Pisum sativum*.)**
Phytopath. Z., 1956, **26**: 57-80, bibl. 37, illus.

Water extracts of roots and shoots from plants with *Rhizobium* nodules stimulated nodule formation on "sterile" roots. No nodules were formed on pea roots when the plants were kept in the dark for longer than 10 days. Plants which were inoculated with bacteria in daylight before being put in the dark also formed no nodules. The number of nodules formed when the shoots were exposed to daylight increased with the number of days of exposure. Illumination of the root as well as the shoot by daylight or by blue light inhibited nodule formation, though red light was not inhibitory. Illumination of pea roots or *Rhizobium* cultures before bringing them together did not affect nodule formation. The form of the root system was altered by nodule formation. The dry weight of nodular roots was similar to that of "sterile" roots, but shoots of nodular plants were heavier than those of "sterile" plants.

2792. Zopf, P. E., Jr., and Nettles, V. F.
Root development of Contender snap beans.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 175-7, bibl. 6, illus.

Bean roots from a spring planting were dug up (i) at full development of the first trifoliate leaf, (ii) at the first harvest and (iii) at the last harvest. At the first excavation roots were mainly concentrated in the upper 5 in. of the soil, with a maximum lateral extension of 8·5 in. from the stem. At the first harvest the maximum penetration appeared to be limited by the subsoil, while the maximum root spread was 17 in. from the stem. There was little change in root spread between the first and last harvests. The marginal roots examined at the time of the last harvest were dead or nonfunctional, and nutritional support for the plant was supplied by a new root system. In an autumn crop of beans the root spread at excavation (i) was 15 in. The autumn crop, which was not irrigated, showed deeper root penetration than the spring crop.—Hort. Dep., Gainesville.

2793. Robins, J. S., and Domingo, C. E.
Moisture deficits in relation to the growth and development of dry beans.
Agron. J., 1956, **48**: 67-70.

Yield reductions of dry beans of about 20% were obtained when visible moisture stress persisted for 15 days before flowering, for 18–22 days during flowering, or for about 15 days before ripening of the first pods. During flowering and late in the season vegetative yields were reduced to a greater extent and by shorter stress intervals than before flowering. Lower yields were due to reduced pod number by stress before flowering, reduced pod and bean number by stress during flowering and reduced bean weight by stress during maturation. Plant development was delayed by moisture deficits before flowering and promoted by moisture deficits before flowering and promoted by moisture deficits during flowering and during maturation.—Agric. Res. Serv., Irrig. Exp. Stat., Prosser, Wash.

2794. Wedding, R. T., and others.
Growth regulators on beans.
Calif. Agric., 1956, **10**(4): 4, 12.
Maturity of Concentrated Fordhook lima beans was not significantly delayed by sub-lethal concentrations of 2,4-D applied within 1 month of the estimated time of crop maturity. 2,4-D applications 2–4 weeks after the emergence of lima or snap bean seedlings sometimes resulted in large increases in yields, sometimes had no effect and in some experiments considerably reduced yields. The treatment initially stopped all development for 10–14 days, and subsequent growth showed typical 2,4-D-induced distortions. Alpha-orthochlorophenoxypropionic acid and N-metatolyl-phthalamic acid sprays showed promise in preventing premature fruit drop of runner beans when applied to the flowers.

2795. Lingle, J. C., and Holmberg, D. M.
Zinc-deficient crops.
Calif. Agric., 1956, **10**(2): 13-14, illus.
Zinc deficiency symptoms on snap and lima beans and on tomatoes are described. Foliar sprays of Zn and Mn sulphates and of chelates applied in field tests to tomatoes did not materially affect Zn deficiency.

2796. Lange, W. H., Jr., Seyman, W. S., and Leach, L. D.
Seed treatment of lima beans.
Calif. Agric., 1956, **10**(4): 3, 15, illus.
Methods of seed treatment of lima beans with combined insecticide/fungicide dressings are described. Aldrin, dieldrin, endrin, heptachlor, isodrin and lindane have all been successfully combined with thiram or captan as slurry or liquid fixation treatments. Lindane was one of the best all-round protectants against insect attack, but endrin and isodrin were the only materials to control springtail attacks on germinating lima beans. Some varietal susceptibility to damage from seed treatments was apparent.

2797. Ditman, L. P., Cox, C. E., and Kantzes, J. G.
Treatment of pea, snap bean, and lima bean seed with insecticides and fungicides.
J. econ. Ent., 1955, **48**: 688-93, bibl. 1, illus.
In Maryland severe early season losses of peas and snap and lima beans are occasionally caused by the seed-corn maggot, *Hylemyia cilicrura*, and by seed decay. This paper reports 2 years' work on seed treatment of these crops by the slurry method with the insecticides lindane, aldrin, dieldrin and chlordane and the fungicides thiram, captan and chloranil. When soil conditions were extremely unfavourable or extremely favourable to germination, little benefit was obtained from seed treatment. Between these extremes very good responses were obtained, especially from combined insecticidal-fungicidal treatments. The fungicides captan and thiram were more satisfactory than chloranil, and the 4 insecticides, used as emulsions, were about equally effective.—College Park, Md.

2798. DeZeeuw, D. J., Andersen, A. L., and Guyer, G. E.
Comparison of fungicide and fungicide-insecticide seed treatments of peas and beans.
From abstr. in *Phytopathology*, 1956, **46**: 10.
In 3 years' trials in Michigan the 3 best treatments in order of effectiveness were: on peas—Orthocide 75 (75% captan), Phygon S.P. (50% dichlone) and Merculine (10% phenylmercury salicylate); and on beans—Ortho Seed Guard (25% captan plus 25% lindane), DuPont I and D (56% thiram plus 14% lindane) and Orthocide 75.

2799. Hagedorn, D. J.
Testing canning pea seed for adequacy of seed treatment.
From abstr. in *Phytopathology*, 1956, **46**: 13.
The technique involved germinating seed in infested soil rolled in paper towels. Seed treated commercially with dichlone or captan germinated better than that treated with chloranil.

2800. F. W. Berk and Co. Ltd., London.
Experiments on the effect of seed dressings containing organo mercury and tetramethyl thiuram disulphide on the yield of peas.
Tilgate Tech. Bull. **2**, 1955, pp. 5, bibl. 1.
TMTD was more effective on the basis of emergence counts, but organo mercury application resulted in higher yields of peas.

2801. Dye, D. W.
Field trials on control of halo blight of beans (*Pseudomonas phaseolicola* (Burkholder) Dowson).
N.Z. J. Sci. Tech., Sect. A, 1956, **37**: 458-61, bibl. 5.
In field trials with heavily infected bean plants bordeaux mixture (6–8–100) and streptomycin sulphate (75 p.p.m.) controlled the disease in 2 seasons, bordeaux giving the higher degree of control. Phygon XL was not satisfactory. In 1953-54 both bordeaux and streptomycin significantly increased pod yields, but in 1954-55 only streptomycin had this effect.—D.S.I.R., Auckland.

2802. Napier, E. J., and others.
The systemic action against *Pseudomonas medicaginis* var. *phaseolicola* of a streptomycin spray applied to dwarf beans.
Ann. appl. Biol., 1956, **44**: 145-51, bibl. 10.
Streptomycin sulphate solution applied to the primary leaves of dwarf beans showed a marked and consistent systemic antibacterial, prophylactic action even at sites as far removed from the point of application as the fourth trifoliate leaf. This systemic protection against the halo blight organism persisted for various periods up to a maximum of 11 days. Mannosidostreptomycin was much inferior to streptomycin in its systemic prophylactic action against halo blight. [From authors' summary.]—Glaxo Labs Ltd., Stoke Poges, Bucks.

2803. Crowdy, S. H., and others.
The translocation of antibiotics in higher plants. II. The movement of griseofulvin in broad bean and tomato.
J. exp. Bot., 1956, **7**: 42-64, bibl. 9.
The uptake and translocation of griseofulvin from water culture by broad bean and tomato has been studied; observations were also made on its decay in broad bean. The amount taken up by the broad bean was proportional to the volume of water transpired for single concentration of the treating solution, and the

decay was exponentially related to the time of exposure in the tissues. The accumulation in the tissue had, therefore, an exponential component, but within the limits of error there was constant relationship between accumulation and transpiration over the time periods used in the trials. The rate of accumulation in tomato was also constant. The amount accumulated by both bean and tomato after a definite time was a linear function of the concentration of the treating solution. There were two processes involved in the uptake of griseofulvin by the broad bean: (1) an initial rapid entry into the roots which was inhibited by sodium azide and dinitrophenol at concentrations which did not reduce transpiration; and (2) a prolonged uptake linearly related to transpiration which was not affected by these concentrations of the inhibitors. [From authors' summary.—I.C.I. Ltd., Akers Res. Lab., Welwyn, Herts.] [For Part I see *H.A.*, 26: 1943.]

2804. Olgyay, M., and Lehoczky, J.
A borsófajták ascochytás érzékenysége, fungicidek stimuláló hatása és permetezés. (**The susceptibility of peas to *Ascochyta* and pea stimulation by fungicides.**) [Russian and English summaries ½ p. each.]
Agrártud. Egy., 1953 (issued 1954), **17**(1, Part 1): 113-26, bibl. 1.

Varietal differences in susceptibility to *Ascochyta* infection were studied. Seed treatment with a fungicide was only of value when it was stimulatory. Dusting was preferable to spraying, especially with marrow-fat peas. A solution of 0·2–0·3% silver nitrate stimulated growth. Sprays of copper sulphate and mercury were unsatisfactory. Sprays of lime-sulphur or 1% bordeaux applied to the young plants starting at the 4–5-leaf stage and repeated three times gave satisfactory control of *Ascochyta*.

2805. Ruppel, R. F.
Effectiveness of certain residual insecticides in preventing emergence of the bean weevil from infested bean seeds.
J. econ. Ent., 1955, **48**: 757-8, bibl. 8.

In trials in Colombia the most promising materials for killing *Acanthoscelides obtectus* weevils within the bean seed were heptachlor and aldrin. Other insecticides giving good control affected seed germination.

2806. Schopp, R., Brindley, T. A., and Hinman, F. G.
Factors affecting pinhole injury to dry peas by the pea weevil.
J. econ. Ent., 1955, **48**: 693-5.

Studies conducted in Idaho from 1940 to 1946 indicated that rapid ripening or conditions associated with it cause an increase in pinhole injury by the pea weevil, *Bruchus pisorum*. In addition to adult weevil control there are 2 means of reducing this type of injury: (1) early sowing with the expectation that in most years the crop will mature before the weather becomes hot and dry, and (2) delaying harvest until the peas are ripe, by which time the separation of injured from sound peas is practicable.

2807. Veenenbos, J. A. J.
De bestrijding van de bonevlieg (*Chortophila cilicrura*). (**Control of bean seed fly.**)
Tijdschr. PlZiekt., 1956, **62**: 29-30.

Incorporation of spinach into the soil before sowing beans will reduce seed fly attack. A seed-dressing of aldrin, dieldrin or heptachlor reduces larval attack. Germination was unfavourably affected by insecticide dressings but not by fungicide dressings. A combined dressing of TMTD and aldrin gave good results.—PlZiekt. Dienst.

2808. Tang, R. C-W.
Chemical defoliation of dry beans.
Diss. Abstr., 1956, **16**: 6-7, being *Publ.* 15434 of 143 pp.

In field and greenhouse tests Endothal (containing disodium 3, 6-endoxohexahydrophthalate) and Shed-A-Leaf (containing sodium chlorate and sodium pentaborate) were the most promising defoliants for hastening the maturity of dry beans [see also *H.A.*, 26: 634]. Differences in yield between defoliant-treated and non-treated plants were observed in some experiments but not in others. Defoliation by Endothal and Shed-A-Leaf was increased by higher temperatures. Low soil moisture gave higher percentages of defoliation and desiccation than soil moisture near field capacity. At a temperature of 50–60° F. the metaborate formulation of Shed-A-Leaf powder, Dry Shed-A-Leaf and Endothal 4069 gave the best defoliation results. The effect of Shed-A-Leaf did not appear to be translocated from the petiole to the abscission zone.

Mushrooms.

(*See also* 2407, 2864t, 2865a.)

2809. Arnold, W.
Research in Eastern Germany.
Bull. Mushroom Grs' Ass., 1956, No. 75, pp. 76-8, illus.

The East German Government has sponsored and financed an Institute for Mushroom Research and Scientific Experimentation at Dieskau, which was founded 3 years ago as part of the Martin Luther University at Halle-Wittenburg. Among the problems being studied are differentiation of varieties, spawn improvement, and experiments on compost substitutes for horse manure.

2810. Bukowski, T.
Wpływdwuchlorku etylenu $C_2H_4Cl_2$ na przyśpieszenie kiełkowania zarodników pieczarki. (**The influence of ethylene-bichloride, $C_2H_4Cl_2$, on the germination of the spores of *Agaricus hortensis* Cooke.**) [English summary.]
Acta Microbiol. Polonica, 1954, **3**: 395-7, from abstr. in *Biol. Abstr., Sect. D*, 1956, **30**, No. 8619.

Ethylene-bichloride has a stimulating effect on germination of spores of *Agaricus hortensis*. After 5 minutes' exposure to vapours of $C_2H_4Cl_2$, germination followed in about 8 days. A bactericidal effect was reached after 3 hours of exposure. [Author's summary.]

2811. Stoller, B. B., West, R. E., and Bailey, J. F.
Controlling the mildew disease of the cultivated mushroom.
Plant Dis. Reptr, 1956, **40**: 193-9, bibl. 4, illus.

Of 32 chemicals tested against *Dactylium dendroides*, terraclor (pentachloronitrobenzene) was the best. Experiments with terraclor in mushroom houses have shown that this fungicide can eradicate *Dactylium* mildew even after the disease is well established on the beds, and that it has a relatively long residual effect.—West Foods of Calif., Soquel.

2812. Moreton, B. D., John, M. E., and Goodey, J. B.
Aphelenchoides sp. destroying mushroom mycelium.
Nature, 1956, **177**: 795, bibl. 7, illus.

Populations of *Aphelenchoides* sp. have frequently been encountered in samples of compost from poorly cropping mushroom beds. One set of pots each containing 300 g. compost was inoculated, at the time of spawning, with 15 specimens of *Aphelenchoides* sp. and another set with 15 specimens of *Panagrolaimus* sp., a third set constituting the control. In the two latter series cropping lasted from the 5th to the 11th week, whereas in the pots inoculated with *Aphelenchoides* sp. cropping ceased at the end of the 6th week. An examination of the compost showed that in the *Aphelenchoides* series the mycelium had largely disappeared, while the eelworms had multiplied to approximately 3 million. In the other two series the mycelium was undamaged, and the number of *Panagrolaimus* organisms in the inoculated pots had only increased to about 72,000.—N.A.A.S. Wye, Kent, and Rothamsted exp. Stat.

Onions and related crops.

See also 2374, 2376, 2379, 2387, 2713-2715, 2737m, 2738, 2864z, 2865d, j, l, n, 2866 l, r.)

2813. Das, B. C., and Dhyani, K. C.
Influence of differential spacing and nitrogen fertilization on growth and yield of onion.
Phyton, 1956, **6**: 47-56, bibl. 8.

Four levels of N as sulphate of ammonia and 4 spacings were compared in a field trial with Patna Red onions. The results were as follows: (1) 80 lb. N per acre with 9- to 12-in. spacing was optimum for fresh and dry weight of tops, height of plant and size of bulb. (2) 60 lb. N was best for fresh and dry weight of bulb with 12-in. spacing. (3) Number of leaves was increased by 60 lb. N and 9- to 12-in. spacing. (4) Highest yield, in weight, was obtained with 60 lb. N and 4-in. spacing. (5) Bulb size was greatest at the widest spacing and poorest at the closest spacing. (6) 60–80 lb. N per acre with 9-in. spacing is recommended for the best market value and 4-in. spacing for the highest tonnage under Banaras conditions.—Coll. Agric., Banaras Hindu Univ.

2814. Savčenko, N. A.
Selectivity of fertilization in the onion. [Russian.]
Agrobiologija, 1955, No. 6, pp. 141-3.

Onion seed plants were chosen with 3 flower heads each, the first of which was artificially pollinated with pollen from a single flower head, the second with mixed pollen from several heads and the third was open pollinated. Seed yields and quality were lowest from the first flower head and highest from the third. When rows of 3 yellow-bulbed varieties were interplanted with rows of 1 red-bulbed variety, the resultant seeds from the yellow-bulbed plants produced some yellow and some red bulbs, the proportion of red bulbs depending on the variety, e.g. Zittauer 29·3%, Johnson 7·6% and Markovskiĭ 1·0%.

2815. Lubatti, O. F., and Blackith, R. E.
Fumigation of agricultural products. XIII. Trials of onion seed treated with methyl bromide, and an improved method for its analysis.
J. Sci. Food Agric., 1956, **7**: 149-59, bibl. 20, illus.

Two varieties of onion seed were fumigated with methyl bromide over a range of moisture contents. The highest concentration-time product used was applied either as a high dose for a short time or as a low dose for a longer period. The germination of seeds in soil is a better measure of the damage done by fumigating moist seed than are laboratory tests on paper pads. Once a seed succeeds in germinating in soil its eventual yield is independent of the treatment received by the seed. Seed dry enough to store with unimpaired germination should not contain more than 10% of moisture and will then withstand concentration-time products of 1,100 mg. h./l. irrespective of the way in which this product is made up. A slight enhancement of total germination with dry seed properly fumigated was confirmed but is too small to be of economic value. Similarly, the slightly delayed germination of such seed appears to be of little practical consequence. Most of the damage done by fumigating damp seed occurs during the fumigation period rather than during subsequent storage. [From authors' summary.]—Imp. Coll. Field Stat., Sunninghill, Berks.

2816. Aytoun, R. S. C.
The effects of griseofulvin on certain phytopathogenic fungi.
Ann. Bot. Lond., 1956, **20**: 297-305, bibl. 10, illus.

The *in vitro* reactions of actively-growing hyphae of *Botrytis* spp. entering an environment containing griseofulvin are reported. *In vivo Botrytis tulipae* was not able to penetrate cell membranes in the stems of tulips watered with griseofulvin. Depending on concentration the antibiotic delayed or prohibited the penetration of onion epithelium by *B. allii*.—Glaxo Labs, Stoke Poges, Bucks.

2817. Harrison, D. E.
Onion white rot. Further control experiments.
J. Agric. Vict., 1956, **54**: 17-20, bibl. 7.

The value of seed pelleting with calomel for control of onion white rot (*Sclerotium cepivorum*) has been confirmed under Victoria conditions [for earlier report see *H.A.*, 25: 1734]. Applications of 2 lb. of calomel to 1 lb. of seed have given good control of the disease in a heavily-infected soil plot. Dipping of onion transplants in a calomel paste has also given significant control of white rot in a small trial.

2818. Heddergott, H., and Pauck, P.
Weitere Erfahrungen zur Biologie und Bekämpfung der Zwiebelfliege (*Phorbia antiqua* Meig.). **(Further observations on biology and control of the onion fly.)**
NachrBl. dtsch. PflSchDienst., Braunschweig, 1956, **8**: 49-53, bibl. 4, illus.

The pelleting of onion seeds with aldrin or dieldrin or with mixtures of the two gave very satisfactory control of onion fly. Other chemicals and methods of protection tested proved less successful. The treatment of onion sets with aldrin or dieldrin dust before planting gave promising results, but the toxicity of the onions at harvest time has not yet been studied.—PflSchAmt LandwKammer Westfalen-Lippe.

2819. Nolte, H.-W.
Weitere Untersuchungen zur Bekämpfung der Zwiebelfliege (*Phorbia antiqua* Meigen) mit synthetischen Kontaktinsektiziden. (Further experiments on the control of onion fly by synthetic contact insecticides.)
NachrBl. dtsch. PflSchDienst, Berlin, 1956, **10**: 25-32, bibl. 19, illus.

Control of onion bulb fly on a large-scale may be obtained by seed pelleting with aldrin, dieldrin or DDT-50 [see also *H.A.*, 25: 2913]. When dieldrin is used sowing should follow immediately, but seeds coated with aldrin or DDT may be stored for 3 days. On a small scale control may be obtained by dusting the rows when the plants are 8–10 cm. high with aldrin or chlordane. No taint was apparent in the harvested onions and there were no toxic residues.—Inst. Phytopath., Aschersleben, Berlin.

2820. Lear, B.
Split-dosage applications of soil fumigants to control stem and bulb nematode on garlic in California.
From abstr. in *Phytopathology*, 1956, **46**: 18.

Split applications, each half the total amount of 50 gal. D-D or 5 or 10 gal. Nemagon (1,2-dibromo-3-chloropropane) per acre, were made 10 days apart in May for the control of *Ditylenchus dipsaci*. Garlic cloves were planted 7 months later. All treatments resulted in much higher yields than the controls with far fewer discarded bulbs. Bulbs produced on the Nemagon-treated plots were smaller than those from the D-D plots.

Rhubarb.

2821. Smith, F. G.
Surprise results from rhubarb tests.
Grower, 1956, **45**: 997-9.

Some results are reported of experiments on rhubarb carried out at Stockbridge House Experimental Horticulture Station, Yorks. Plants responded to farmyard manure and N applications but showed no response to P and K, in spite of very low levels of these nutrients in the soil. There was a significant response to lime in soil with an initial pH of 5. A wide spacing in the field (36 in. square) gave a higher yield of forced rhubarb per root than closer spacings (24-32 in. square), but the closer spacings gave the higher yields per unit area of land without any reduction in quality. Factors which prolong the growth period of rhubarb tend to increase the number of flower stems produced the following season. Old plants become dormant earlier than young plants owing to increased competition for soil moisture and nutrients. The later roots become dormant in the autumn, the earlier they break into growth in the spring.

Root crops.

(*See also* 2385, 2415v, 2422, 2704, 2864a, h, m, y, 2865q.)

2822. Miyagi, K.
Experiments on carrot seed growing. I. Effects of pruning and rainfall on yield and viability of carrot seed. [Japanese, with English summary ¼ p.]
J. hort. Ass. Japan, 1956, **24**: 254-60, bibl. 16, illus.

In carrot seed production studies the following results were obtained: (1) Limiting the number of umbels per plant improved seed weight and size but not viability. (2) In outdoor plants the viability of seeds of first-order umbels was highest and that of third-order umbels lowest, but in greenhouse plants the difference was negligible. (3) Rainfall at the flowering stage often made the flowers sterile and at the ripening stage it lowered viability. (4) The seeds of early-flowering plants had better viability than those of late-flowering plants. It is concluded that third-order umbels should be cut off to improve the viability of the seed crop.

2823. Banga, O., and de Bruyn, J. W.
Selection of carrots for carotene content. III. Planting distances and ripening equilibrium of the roots. [Dutch summary ⅓ p.]
Euphytica, 1956, **5**: 87-93, bibl. 3, illus.

The effect of planting distance on total carotenoid content and root shape was studied in 3 sowings of Amsterdam Forcing carrots. Carotenoid content increased as the roots changed from a pointed to a stump shape, both phenomena being expressions of the stage of root maturity. The relation between total carotenoid content and dry root weight was different at the 3 planting distances. At greater planting distances the roots grew larger, more wide-shouldered and pointed, and the total carotenoid content increased more slowly than at closer spacing. There was a distinct interaction between temperature and planting distance in their influence on root growth and maturation. [For parts I and II see *H.A.*, 25: 1743 and 3995.] —Inst. hort. Plant Breeding, Wageningen.

2824. Truscott, J. H. L.
Bitter flavour in stored carrots.
Bienn. Rep. hort. Exp. Stat. Prod. Lab. [Vineland] for 1953 and 1954, pp. 108-9.

Carrots, variety Red Cored Chantenay, developed a marked bitter flavour when stored at 32° F. Tests showed that the bitterness was a physiological disorder which seemed to be completely reversible by exposure to higher temperatures. Removal of the roots to room temperature a few days before sale or processing is a practical method of control.

2825. Dore, J., and Williams, W. T.
Studies in the regeneration of horseradish. II. Correlation phenomena.
Ann. Bot. Lond., 1956, **20**: 321-49, bibl. 8, illus.

Regeneration of complete plants and fragments of various sizes was studied, together with the effect of externally-applied IAA. Regeneration in the intact plant was inhibited by the growing crown; in cuttings

IAA reduced the rate of primordium formation but could not entirely suppress it. The bud primordia/root primordia ratio was about 0·5–0·9 in long cuttings; it rose sharply in cuttings less than 2 cm. long and fell in the presence of IAA. At an appropriate concentration IAA depressed bud extension and promoted root extension. [For Part I see *H.A.*, 25: 1747.]—Univ. Southampton.

2826. Janíček, G., and Čapek, A.
Studie těkavých fytoncidů křenu. (**A study of the volatile phytoncides of horseradish.**) [Russian and English summaries 10 and 7 lines respectively.]
Sborn. čsl. Akad. zeměd. Věd. Rostl. Výroba, 1955, **28**: 761-70, bibl. 26, illus.

The volatile phytoncide of horseradish, which was found to be allylisothiocyanate, has been shown to possess valuable properties for food preservation. [See also *H.A.*, 21: 293.]

2827. Wilson, J. D.
Comparative control of radish yellows by various soil fumigants and fungicides.
From abstr. in *Phytopathology*, 1956, **46**: 31.

Materials which gave good control of radish yellows (*Fusarium oxysporum* f. *conglutinans*) in the greenhouse when thoroughly mixed with the soil were Crag 974 (95% tetrahydro-3,5-dimethyl-2*H*-1,3,5-thiadiazine-2-thione), chloropicrin and EDB.

2828. Bravenboer, L., and van Zanten, E.
Grondontsmetting bij schorseneren. (**Soil sterilization for scorzonera.**)
Jaarversl. Proefstat. Groent. Fruit. Glas, Naaldwijk, 1955, pp. 70-2, illus.

Soil treatment with DD or formalin resulted in increased yields of scorzonera. The occurrence of cigar-shaped roots was more successfully reduced by formalin than by DD.

Salad crops.

(*See also* 2354, 2361, 2390, 2404, 2716, 2864p, u, 2865p.)

2829. van Hoof, H. A.
Vuur bij andijvie. (**Fire in endive.**)
Tijdschr. PlZiekt., 1956, **62**: 22-3.

Endive fire, caused by *Marssonina panattoniana*, becomes more widespread in cold, wet weather. In a field trial sprays of captan and maneb reduced infection from 100% to 20%. Maneb sprayed 10 days after transplanting endive also gave good control of *Alternaria*.—Inst. PlZiekt. Onderz., Wageningen.

2830. Aycock, R., and Winstead, N. N.
Viruses plague lettuce.
Res. and Fmg N.C., Summer and Autumn, 1955, p. 7, illus.

Big vein virus is soilborne and infection takes place only through the root system, but mosaic is seedborne and is transmitted by aphids. In an experiment at Castle Hayne the use of indexed mosaic-free seed increased yields by slightly more than 1 ton per acre. At harvest time only 8·4% of the plants from indexed seed were infected, compared with 40% of the plants from regular seed.

2831. Smieton, M. J., and Montgomery, N.
The infestation of winter lettuce by aphids and its control.
Ann. appl. Biol., 1956, **44**: 67-79, bibl. 7.

The damage done to winter lettuce crops by aphids, notably *Nasonovia ribis-nigri* was studied over 6 seasons. Aphid infestation was reduced by dipping the plants in nicotine solution at the time of transplanting in November, but dusting with BHC was more effective. By delaying transplanting until February or March a relatively clean crop could be produced by insecticide treatment, but losses from fungal diseases were usually high.—Imp. Coll. Sci. Tech., London.

Spinach.

(*See also* 2371, 2422, 2717, 2807.)

2832. Geissler, T.
Weitere Untersuchungen über die Nährstoffaufnahme durch die Blätter bei Spinat. (**Further studies on nutrient uptake by spinach leaves.**)
Arch. Gartenb., 1955, **3**: 219-26, bibl. 2, illus.

In pot experiments with young spinach plants in sand leaf painting with 1·5–5% nutrient solution increased both nutrient uptake and yield. N, P_2O_5 and K_2O were absorbed by the plants singly and in combination, but N was the most readily absorbed [see also *H.A.*, 25: 639]. Increases in K_2O and P_5O_2 uptake corresponded to leaf applications, but increases in leaf N contents were higher than leaf N applications. Foliar applications of a deficient element stimulated the uptake of other elements from the soil.—Inst. Gemüseb., Humboldt Univ., Berlin.

Tomato, capsicum and eggplants.

(*See also* 2354, 2361, 2364, 2370, 2372, 2377, 2404-2407, 2503n, 2504h, 2718, 2719, 2722, 2781, 2864b, d, f, i, n, o, s, x, 2865b, c, e, g, i, t-v, z, 2866a, f, h, j, k, n, o, q.)

2833. Liger, P.
Note sur le comportement de sept variétés de tomates hawaïennes dans la région de Bône. (**Performance of seven Hawaiian tomato varieties in the Bône district.**)
Fruits et Prim., 1955, **25**: 518-21, bibl. 2, illus.

Seven Hawaiian tomato varieties resistant to spotted wilt, leaf spot (*Septoria lycopersici*) and *Fusarium* wilt and some other processing varieties were tested in the Bône district of Algeria in 1952/55. Of these Oahu and Lanaï and of local varieties San Marzano, Marglobe, St. Pierre and Pearson showed good cultural and processing qualities. Oahu was early and resistant to *Fusarium* and did well in a range of soils. Lanaï was susceptible to drought. San Marzano and Marglobe did well in moderately damp soils. St. Pierre and Pearson required damp soils or irrigation. Among the factors assessed were yield, fruit size and resistance to blossom-end rot.

2834. Service de l'Horticulture, Rabat.
Note sur certaines caractéristiques de quelques variétés de tomates destinées à l'industrie au Maroc. (**Notes on the characters of some processing tomatoes in Morocco.**)
Terre maroc., 1956, **30**: 12-17.

Trials were made on 20 local and foreign varieties of processing tomatoes under irrigated culture in north and south Morocco for 2 years. The characters studied were total yield, pulp %, dry extract %, sugars content, acidity and sugars/acids ratio. The U.S. varieties, Great Baltimore and Rutgers, gave the best results.

2835. Nazarov, S. P.
Inter-family vegetative hybridization of plants. [Russian.]
Priroda, 1956, **45**(3): 95-6, illus.

To obtain a union between tomato scions and cucurbitaceous rootstocks tomato seeds were germinated in extracts of marrow, watermelon or cucumber seedlings and were then grafted into the growing points of the rootstock species in the sap of which they had germinated. Some morphological characteristics of the grafts are described and their seedling progeny will be studied.

2836. Pollack, B. L., and Larson, R. E.
Factors affecting embryo size, and the influence of embryo size on germination, time to maturity, and productivity in F_2 generation tomatoes.
Bull. Pa agric. Exp. Stat. **606**, 1955, pp. 34, bibl. 39.

No measurable association was found to exist between weight of individual seeds from F_1 fruits and total yield of the plants produced from them. A positive correlation did exist, however, between size of seed and amount of early yield. A correlation also existed between number of days to germination and early yield within groups of seed having the same weight.

2837. Fedorjukov, M. I.
Raising tomato seedlings without frame sashes. [Russian.]
Sad i Ogorod, 1956, No. 3, pp. 35-7.

Soaking tomato seeds for 12 hours followed by alternating warm and cold treatment (8 hours room temperature, 16 hours buried in snow) repeated for 20 days enabled plants to be raised in frames without glass covers and with only mat covers during the night. The seedlings, which grew slowly at first, withstood −2·4° C. two days after planting out and eventually produced higher yields than plants raised by the usual method in frames under glass.

2838. Piquer, G.
Utilisation de la lumière artificielle dans l'élevage des plants de tomate en hiver. **(The use of artificial illumination to raise tomato plants in winter.)**
Bull. Inst. agron. Gembloux, 1955, **23**: 430-55, bibl. 19, illus.

The tomato variety Tuckwood Improved Kondine Red was grown in winter under various intensities of light from various sources. At 300 watts/sq. m. for 16 hours per day the first truss became visible 6–7 weeks after sowing. In control plants with no extra light the first truss did not appear for about 12 weeks. The position of the truss on the stem was lowered with increasing light intensity. About 15 days from sowing a difference in growth between plants under 300 watts/sq. m. and control plants was observed. Artificial illumination also reduced the growth check when plants were potted up. Fluorescent Phytor tubes were slightly better than mercury vapour lamps in accelerating growth and development.

2839. Kristoffersen, T.
Forsøk med kunstig lys til tomat. **(Trials with artificial light for tomatoes.)**
Gartneryrket, 1956, **46**: 101-13, illus.

For the raising of tomato plants fluorescent lamps proved much better than mercury vapour lamps, the optimum intensity of light for plants sown during the period December to mid-January being 200–300 watts per sq. m. Continuous light treatment at a temperature of 14–15° C. resulted in better plants than interrupted treatment with 3–6 hours' darkness at night at 18–20° C. Seedlings should be pricked out widely (6×6 or 7×7 cm.) or into soil pots, and after pricking out illumination should continue for as long as possible, i.e. for about 3 weeks. Calculations show that 3 weeks' illumination with fluorescent light at 250 watts per sq. m. increased returns by 4 kr. per plant at a cost of only 25 øre per plant.

2840. Cappaert, A.
Essais orientatifs sur tomates en aquiculture. **(Exploratory trials on tomatoes in water culture.)**
Bull. Inf. INEAC, 1956, **5**: 1-25, illus.

A detailed account is given of 3 tomato sand culture experiments in Haut-Katanga. Growth, yield, quality, truss yield and fruit weight were studied in relation to variety, medium, spacing, frequency of application and concentration of nutrient. The general conclusions were: (1) Laterite gravel was a better medium than broken quartz. (2) Close spacing (14–20 plants) gave the highest yields per container of 0·45 sq. m. (3) Frequent application of nutrient was beneficial; in one trial the yield was more than doubled by increasing the number of daily applications from 2 to 7. (4) A nutrient concentration of 37 m.e./l. was satisfactory. (5) Merveille des Marchés gave the best yield, average weight per fruit and quality in a trial of 7 varieties. Production costs are discussed.—Keyberg exp. Stat.

2841. Marlowe, G. A., Jr.
The effects of varying levels of nitrogen, phosphorus, potassium, and magnesium on the growth, leaf composition, and fruit production of the tomato, *Lycopersicon esculentum* var. *commune* Bailey.
Diss. Abstr., 1955, **15**: 1964, being *Publ.* 14211 of 75 pp.

Studies on the effect of nutrient supply on tomato were carried out in sand cultures in the greenhouse with 3 levels of N, P, K and Mg in the nutrient solution, and in field trials with application of a commercial nutrient spray. Maximum leaf dry matter was found with a nutrient concentration, in m.eq./l., of 18 N, 1 P, 6 K and 6 Mg. The greatest yields were associated with a concentration, in m.eq./l., of 6 N, 3 P, 2 K and 6 Mg. Chemical analysis of greenhouse plants producing the greatest yields showed the presence, in mg./g. dry weight, of 22 total N, 7 P, 18 K and 14 Mg in the leaves. Comparable figures for the leaves of field-grown plants were 55 total N, 2 P, 30 K and 7 Mg at the time of greatest fruit produc-

tion. The average yields of marketable fruit under field conditions exceeded 19 tons per acre. The foliar nutrient sprays did not increase the earliness or total yield of fruit produced in this experiment.

2842. Geraldson, C. M.
The use of calcium for control of blossom-end rot of tomatoes.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 197-202, bibl. 16.

The prevalence and severity of blossom-end rot has been correlated with percentages of Ca in the soil solution. Factors associated with the occurrence of blossom-end rot were shown to affect adversely either the percentage of Ca in the soil or the uptake and translocation of Ca in the plant. Blossom-end rot incidence was reduced by maintaining the Ca level in the soil solution above 20% of total salts throughout the growing season. The ability to recognize factors which tend to repress the Ca percentage during the growing season was also an important factor in control. Supplementary Ca sprays (0·04 M calcium chloride) may be used when an approaching Ca insufficiency cannot be corrected or avoided in other ways.—Gulf Coast Exp. Stat, Bradenton.

2843. Jones, J. P., and Alexander, L. J.
Studies on the etiology of blotchy ripening.
From abstr. in *Phytopathology*, 1956, **46**: 16.

In investigations on Ohio in 1955: (1) The pink-fruited variety Strain A Globe was moderately resistant and the red-fruited Stokesdale and Rutgers were highly susceptible. (2) The number of diseased fruits increased as the K level decreased when plants were subjected to low temperatures followed by high temperatures. When plants were subjected to normal temperatures this correlation did not hold. In both temperature regimes, however, the amount of blotch was decreased by high-K supply. (3) The effect of tobacco mosaic virus infection upon the incidence of blotchy ripening was variable and not conclusive.

2844. Hilton, R. J., and Shaw, D. A.
Leaf feeding of determinate tomato plants. I. The influences of environment.
Canad. J. Agric., 1956, **36**: 27-35, bibl. 8.

Foliar sprays of 0·5 M. solutions of urea and/or sucrose were applied to Early Alberta tomato plants. Leaves absorbed and utilized urea applied in spray form, but fruit maturity was retarded and the C/N ratio in the leaves was depressed in comparison with root-fed plants. No direct evidence of sucrose absorption was obtained, but an equimolar concentration of sucrose resulted in reduced foliage injury from urea. The urea/sucrose spray significantly increased the development of plant tops and resulted in an abnormally large accretion of starch in plant stems and of soluble carbon in the fruits. Fruit ripening was also delayed, and, although fruit set was normal, the proportion of fruits developing beyond the early post-setting stage was low. [For part II see *H.A.*, 25: 4036.]—Univ. Alberta, Edmonton.

2845. Emmert, E. M.
You can grow early, big tomatoes.
Amer. Veg. Gr, 1956, 4(2): 11, 32, illus.

Beta-NAA plus boron resulted in a better set and larger fruits than hormone alone. Parachlorophenoxyacetic acid increased set but did not affect fruit size; when B was used with this hormone a 2,4-D-type of injury was caused. Sprays of B, sugar and hormone, when applied to tomatoes in poor light conditions, improved fruit size. Dextrose proved a satisfactory form of sugar to use.—Univ. Kentucky.

2846. Radwan, A. A. M.
Effect of certain growth regulators on the yield, earliness and quality of tomatoes.
Diss. Abstr., 1955, **15**: 1964-5, being *Publ.* 14215 of 112 pp.

Tomato plants were given a whole-plant spray or pre-planting dip of 4 growth regulators, viz. *p*-chlorophenoxyacetic acid (CIPA), *o*-chlorophenoxypropionic acid (CIPP), maleic hydrazide (MH) or α-cyano-B-(2,4 dichlorophenyl) acrylic acid (B214). Applications of MH and B214 did not improve total yields. Yields from CIPA-treated plants were not increased, but at a 15 p.p.m. level greenhouse plants cropped earlier; sprays were more effective than dips. Concentrations of 45 and 65 p.p.m. CIPA were toxic to tomato plants. CIPP was less harmful and less effective than CIPA, having no affect on total or early yield. Leaf mineral content and plant mineral uptake was not affected by the growth regulators used, and no change in green pigment content of the leaves was observed.

2847. Hoare, E. R.
Tomatoes gain from large root system.
Grower, 1956, **45**: 1183-5.

In glasshouse trials with Potentate yields from plants grown under sprinkler irrigation were 89 tons per acre, while under trickle irrigation yields were 75 tons per acre. The increased yield came in the pink, and pink and white grades, and the difference in yields was not apparent until mid-July. The results indicate the value of spreading the water to induce a large root system.—Nat. Inst. agric. Engng., Wrest Park.

2848. Calvert, A.
The influence of soil and air temperatures on cropping of glasshouse tomatoes.
J. hort. Sci., 1956, **31**: 69-75, bibl. 5.

When the control (unwarmed) soil temperature was 56–57° F. at planting out time, increases of 5–9° F. for 1 month produced no significant increases in yield of ripe fruit, either for early or for total crop, irrespective of air temperature. A reduction in air temperature produced marked decreases in early yield but had no clear effect on the total crop.—John Innes hort. Instn.

2849. McColloch, L. P.
Effect of low field temperatures on quality of tomatoes.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 188-92, bibl. 3, illus.

Chilling injury occurred to only a small extent on tomatoes ripened promptly at 65° F. after periods of alternating low and high temperatures in the field. Similar fruits kept at 32° and 40° F. for 6–8 days after harvest developed chilling injury during ripening at 65° F. Tomatoes from sheltered plants developed serious chilling injury only after a week or more of temperatures continuously below 50° F. and pre-

dominantly below 40° F. The injury increased as the period of low temperatures increased, and finally *Alternaria* rot developed. During ripening the fruits developed a mottled colour and surface scars typical of those produced on fruits held at 32° F. for 6–8 days before ripening.—Agric. Market. Serv., Beltsville, Md.

2850. Boyle, J. S.
The nature of the internal browning disease of tomato.
From abstr. in *Phytopathology*, 1956, **46**: 7.
Investigations begun in 1951 gave the following results: (1) The disease, a ripening disorder, may become endemic. (2) Plants grown in endemic areas and inoculated with certain strains of tobacco mosaic virus soon after transplanting to the field do not produce internally browned fruits. (3) Cuttings made from plants that have produced internally browned fruits do not themselves do so when planted in endemic areas. (4) Strains of tobacco mosaic virus originating from tomato plants that have produced internally browned fruits consistently cause the internal browning symptom when introduced into healthy plants as the fruits are beginning to ripen. The expression of internal browning symptoms is interpreted as being "shock" reaction coming as a direct result of virus invasion and a hypersensitive response of the host. [See also 2864i.]

2851. Picco, D.
Prove pratiche d'impiego di anticrittogamici acuprici nella difesa del pomodoro. **(Tests on non-copper fungicides on tomato.)**
Not. Mal. Piante, 1956, No. 35/36, pp. 109-11.
In 1955, a year not particularly favourable to fungal diseases, investigations were made in Parma province on the effects of non-copper fungicidal spraying, mainly with zineb, against tomato diseases. Zineb applied 2 to 4 times in late July and August produced substantial yield increases as compared with unsprayed controls. The indexes of antifungal activity of manzate, captan, TMTD, zineb and 1% bordeaux were 10, 10, 8, 7 and 7 respectively. A month after the final treatment the residual effect of 0·3% zineb was equal to that of 1% bordeaux; after 2 months it was still evident but was less than that of the bordeaux. —Lab. critt. Ital., and Osserv. Mal. Piante, Pavia.

2852. Crossan, D. F., and Lloyd, P. J.
The influence of overhead irrigation on the incidence and control of certain tomato diseases.
Plant Dis. Reptr, 1956, **40**: 314-17, bibl. 3.
Lloyd, P. J., and Crossan, D. F.
The influence of irrigation on the incidence and control of tomato anthracnose.
From abstr. in *Phytopathology*, 1956, **46**: 18.
Compared with unirrigated plots, plots receiving four irrigations totalling approximately 4 in. of water in a 30-day period had a significantly higher incidence of tomato anthracnose (*Colletotrichum phomoides*) and fruit rot (caused primarily by *Rhizoctonia solani*) and a significantly lower incidence of blossom-end rot. Maneb and zineb gave significant control of anthracnose under both irrigated and non-irrigated conditions, but maneb was more satisfactory than zineb under irrigation. Both appeared to decrease the severity of blossom-end rot in non-irrigated plots, but neither gave control of fruit rots due to *Rhizoctonia solani*. [From authors' summary.]—Del. agric. Exp. Stat.

2853. Davis, D., and Rothrock, J. W.
Localized systemic activity of griseofulvin in the control of *Alternaria* blight of tomato.
Plant Dis. Reptr, 1956, **40**: 328-31, bibl. 11.
Griseofulvin effectively reduced tomato blight (*Alternaria solani*) in greenhouse tests when applied as a localized systemic agent. Disease is inhibited when griseofulvin is sprayed on the upper leaf surface and inoculation occurs on the lower leaf surface or *vice versa*. The effect of griseofulvin persists in the tissues, since plants inoculated 7 days after treatment developed considerably less disease than the controls. [From authors' summary.]—Merck & Co., Rahway, N.J.

2854. Gäumann, E., and Naef-Roth, S.
Über die chelierende Wirkung einiger Welketoxine. IV. Die Verschiebungen der Toxizität durch steigende Absättigung mit verschiedenen Schwermetallionen. **(On the chelating action of some wilt toxins. IV. Changes in toxicity due to increased saturation with different heavy metal ions.)** [English summary 1¾ pp.]
Phytopath. Z., 1956, **25**: 418-44, bibl. 14.
Increasing concentrations of Mg, Mn, Fe, Co, Ni and Cu ions were added to the wilt toxins Komplexon III and lycomarasmin before application to tomato cuttings. Magnesium ions did not alter the injurious effect of the toxins. With Mn the toxicity of Komplexon III was reduced by 39%, but that of lycomarasmin was unaffected. Both the toxins were detoxicated by increasing amounts of Co, Ni and Cu ions, the maximum inhibition of toxicity occurring at equimolecular saturation of the chelating agents. Fe ions occupy a middle position as regards their capacity for complex formation on one side, and their toxicity for tomato plants on the other.—Eidg. Hochsch., Zürich. [For part III see *H.A.*, 26: 1820.]

2855. Zaumeyer, W. J., and Doolittle, S. P.
Control of late blight on tomato with streptomycin.
From abstr. in *Phytopathology*, 1956, **46**: 32.
Tomato seedlings about 8 in. high were effectively protected against infection by *Phytophthora infestans* by spraying with Agri-mycin 100 (streptomycin plus oxytetracycline), Agristrep (streptomycin sulphate) or Phytomycin (streptomycin nitrate), each at 100 p.p.m. A spray containing 100 p.p.m. of pure streptomycin was less effective in reducing infection than the commercial formulations of the same streptomycin concentration. In limited tests sprays containing 100 p.p.m. of crude streptomycin plus 1% glycerol were less effective than those containing streptomycin alone at the same concentration.

2856. Lear, B., and Jacob, F. C.
Electrical tests on nematodes.
Calif. Agric., 1955, **9**(10): 9, 14.
Tomato soil infested with *Meloidogyne incognita* var. *acrita* was subjected to electrical treatment. The maximum feasible treatment, limited in severity by

voltage breakdown of the soil and temperature rise from the dissipated electrical energy, produced no apparent reduction in the number of nematodes.—Univ. Calif., Davis.

2857. Taschenberg, E. F., and Avens, A. W.
Further studies on control of potato aphid on tomatoes.
J. econ. Ent., 1955, **48**: 685-8, bibl. 6, illus.
Results of earlier field trials [see *H.A.*, 20: 318] showed parathion to be very effective against *Macrosiphum solanifolii* on tomatoes. Data presented from comparative studies, conducted in 1952 with 7 organic phosphorous materials, showed Systox at 1 oz. of actual toxicant per 100 gal. to be the most effective. Parathion continued to give a high degree of control and the addition of bordeaux mixture reduced only slightly the aphicidal performance of parathion. The efficiency of malathion and EPN approached that of parathion. Malathion and parathion residues on green tomatoes were noted.—N.Y. St. agric. Exp. Stat., Geneva.

2858. Halsey, L. H.
Preliminary studies of bruising of "turning" and "pink" tomatoes caused by handling practices.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 240-3, bibl. 2, illus.
Bruising injury increased with the amount of handling. Little or no relationship was found between fruit size or maturity and extent of injury. There were indications of varietal resistance to bruising. The type of injury observed after packing house handling could be reproduced by dropping the fruits from a height of 6 inches on to a solid surface.—Agric. Exp. Stat., Gainesville.

2859. Ozaki, H. Y., Ozaki, C. T., and Hamilton, M. G.
The effects of applied nitrogen, phosphorus, and potash on yield and growth of peppers.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 230-3, bibl. 4.
Three levels of N, P and K were applied in 2 seasons to peppers growing in a fine sand. Increases in P rates above 100 lb./acre did not increase yields. In a season of good rainfall the highest yields were obtained by applying 300 lb. N and 300 lb. K_2O per acre [see also *H.A.*, 26: 1835]. Under low rainfall conditions yields of high-grade fruits were reduced at the highest rate of fertilization (360 lb. N and 360 lb. K_2O) owing to the frequent occurrence of a fruit defect called "injured". The height of plants was only affected by the level of K_2O applied. Both N and K_2O had significant effects on leaf colour.—Everglades Exp. Stat., Belle Glade.

2860. Angeli, L.
Az öntözés hatása a paprika termésmennyiségére és minőségére. (**The effect of irrigation on the yield and quality of paprika.**) [Russian and German summaries 1 p. each.]
Agrártud. Egy., 1951 (issued 1953), **15**(2, part 1): 33-57.
Of methods tested furrow irrigation was the most satisfactory. A rate of 50 mm. water per application was the most economical. The optimum soil moisture content was 60–70% of field capacity. Neither the method nor the rate of application affected the course of ripening. The date of first irrigation should be determined by both soil moisture content and temperature; no application should be made until the temperature has risen above 20° C. Even low rates of irrigation were found to reduce the vitamin C content of the fruit.

2861. Simons, J. N.
The pepper veinbanding mosaic virus in the Everglades area of South Florida.
Effects of certain insecticides and physical barriers on field spread of pepper veinbanding mosaic virus.
Phytopathology, 1956, **46**: 53-7, bibl. 9, illus.
The symptoms are described of a possibly new virus disease of sweet pepper (*Capsicum frutescens* L. var. California Wonder) prevalent in the Everglades area of south Florida during the spring of 1954. Vectors were studied. Parathion and demeton were ineffective against within-field spread. Sunflowers, when used as a barrier crop between the weed source and the peppers, significantly slowed the rate of transmission. Sunflowers sprayed with demeton were only slightly better barriers than unsprayed sunflowers. Results also indicated that a low level of aphid population could cause rapid spread of virus, but that a distance of 150 ft. between the source of virus and susceptible peppers was sufficient to stop transmission under cool autumn and winter conditions.

2862. Krupka, L. R., and Crossan, D. F.
Overwintering and control of *Xanthomonas vesicatoria*.
From abstr. in *Phytopathology*, 1956, **46**: 17-18.
Experiments in 1954/55 showed that the organism can persist for at least 9 months in refuse of infected pepper plants. In a small-scale field test on the treatment of artificially infected pepper seed the lowest infection rate was obtained with a 5-minute dip of 100 p.p.m. streptomycin plus 1% glycerol. [See also *H.A.*, 26: 730.]

2863. Cox, R. S.
Progress in the control of bacterial spot of pepper in south Florida.
Plant Dis. Reptr, 1956, **40**: 205-9, bibl. 9.
Tests showed that *Xanthomonas vesicatoria* can be controlled with Agrimycin 100 foliage sprays. They suggested, moreover, that prevention rather than eradication should be the aim, and for this at least weekly applications are necessary under south Florida conditions.—Everglades Exp. Stat., Belle Glade.

Noted.

2864.
a Anderson, D. M. W., and Greenwood, C. T.
Carbohydrates of the roots of the parsnip, *Pastinaca sativa*.
J. chem. Soc. Lond., January 1956, pp. 220-1, bibl. 8.
Sugars examined chromatographically.

b ANDEWEG, J. M., AND RUYTEN, J. H.
Praktijkproeven tomaten 1954-1955. **(Field trials with tomatoes 1954-1955.)** [English summary ½ p.]
Meded. Dir. Tuinb., 1956, **19**: 170-8, illus.
Data on 56 glasshouse varieties in Holland.

c ANDEWEG, J. M., AND VAN STEENBERGEN, A.
Praktijkproeven met stoksnijbonen 1953-1954. **(Field tests 1953-1954 with pole beans for slicing.)** [English summary ½ p.]
Meded. Dir. Tuinb., 1956, **19**: 222-7, 231, illus.
68 Dutch runner bean varieties compared.

d ANGELI, L.
Paprikafajták előállítása, fenntartása és értékelése. **(*Capsicum* varieties, their selection and evaluation.)** [Russian and English summaries 1 p. each.]
Agrártud. Egy., 1953 (issued 1954), **17**(1, Part 1): 3-23, illus.
Capsaicin-free strains selected and compared.

e ANON.
Brussels-sprouts sprayer.
World Crops, 1956, **8**: 165, illus.
A tractor-mounted cotton sprayer adapted for sprouts, etc.

f BAÏDA, H. S.
Growing grafted plants in the dark. [Russian.]
Agrobiologija, 1955, No. 6, pp. 65-73, illus.
Vegetative hybrids of tomato grafted on potato.

g BANGA, O.
International Conference on the Improvement of Vegetable Varieties at Wageningen, Netherlands, on August 26 and 27, 1955. [Dutch summary ¼ p.]
Euphytica, 1956, **5**: 18-32, illus.
A summary of the reports and discussions.

h BORG, Å.
Bekämpningsförsök mot kålbladstekeln (*Athalia colibri* Christ). **(Experiments on the control of turnip sawfly.)**
Växtskyddsnotiser, 1955, No. 5-6, pp. 87-90, illus.
Parathion and aldrin gave excellent control.

i BOYLE, J. S., AND WHARTON, D. C.
The experimental reproduction of tomato internal browning by inoculations with a virus.
From abstr. in *Phytopathology*, 1956, **46**: 7.
See also abstract 2850.

j BURKE, D. W.
Soil microflora relationships in the development of bean root rot in Columbia Basin soils.
Diss. Abstr., 1955, **15**: 2390-1, being *Publ.* 14225 of 175 pp.
See *H.A.*, 25: 588.

k CARTLEDGE, E. G.
Diseases of crucifers.
Tasm. J. Agric., 1955, **26**: 332-46, illus.
Including nutrient deficiencies and hormone injury.

l CASIDA, J. E., AND OTHERS.
Residual properties of the systemic insecticide O,O-dimethyl 1-carbomethoxy-1-propen-2-yl phosphate.
J. agric. Food Chem., 1956, **4**: 236-43, bibl. 39.
Toxic residues on vegetables largely disappeared within 2 days.

m CHALTIN, G.
Maladies et déformations des scorsonères. **(Diseases and malformations of scorzonera.)**
Courr. hort., 1956, **18**: 122-4, illus.

n CIFERRI, R.
La nutrizione azotata del pomodoro con somministrazione di urea per via fogliare. **(The nitrogen nutrition of tomato by foliar application of urea.)** [English summary 10 lines.]
Atti Ist. bot. Univ. Pavia, 1952 (issued 1953), **10**: 111-15, bibl. 10 [received 1956].

o CONOVER, R. A.
Comparison of fungicides for arresting established tomato late blight infections.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 228-30.

p COX, R. S.
Control of downy mildew of lettuce.
From abstr. in *Phytopathology*, 1956, **46**: 10.
Zineb gave best control of *Bremia lactucae*.

q DAS, D. P., SIDDAPPA, G. S., AND LAL, G.
Canning of dried peas: variety trials.
Indian J. Hort., 1955, **12**: 80-4, bibl. 5.
Six varieties compared.

r ENSLIN, P. R., JOUBERT, T. G., AND REHM, S.
Bitter principles of the Cucurbitaceae. Part II. Paper chromatography of bitter principles and some applications in horticultural research.
Reprinted from *J. S. Afr. chem. Inst.*, 1954, **7**: 131-8, bibl. 15, illus.
The occurrence and inheritance of bitterness in cucurbits cultivated in S. Africa.

s FALK, K., AND MYRSTAD, A.
Sortsforsøk med veksthustomat 1952-54. **(Variety trials with glasshouse tomatoes, 1952-54.)**
Gartneryrket, 1955, **45**: 819-21.
Carrick best of 7 varieties tested in Norway.

t FLEGG, P. B.
The casing layer in the cultivation of the mushroom (*Psalliota hortensis*).
J. Soil Sci., 1956, **7**: 168-76, bibl. 33.
A review.

u GAGNE, J.-B.
Vue d'ensemble sur les problèmes que pose la production de l'endive. **(A review of the problems of chicory production.)**
Ann. Soc. nat. Hort. France, 1956, **2**: 129-37, bibl. 11, illus.
Scientific, technical and commercial problems in France discussed.

v GARTON, J. E., AND CRIDDLE, W. D.
Estimates of consumptive-use and irrigation water requirements of crops in Oklahoma.
Tech. Bull. Okla. agric. Exp. Stat. **T-57**, 1955, pp. 26.
Including early vegetables.

w GHAYUR, A., AND SHARIF, H. M.
Growing off-season vegetables in West Pakistan.
Punjab Fruit J., 1955, **19**: 47-9, bibl. 4.
Chiefly cauliflowers, radishes and turnips, and cucurbits.

x GRANDORI, R., AND BLUMER, G.
Si può combattere la dorifora con calciocianamide. (**Calcium cyanamide controls Colorado beetle.**) [English and French summaries 6 and 5 lines.]
Boll. Zool. agrar. Bachic., 1951, **17**: 149-56, bibl. 2 [received 1956].
On tomato and eggplant but caused leaf burn on eggplant.

y HAINES, R. G.
Studies of the lindane content of tissues of plants grown in soil or nutrient solution.
Diss. Abstr., 1955, **15**: 2376, being *Publ.* 14040 of 123 pp.
Carrots, turnips, snap beans, tomatoes and maize.

z HARMER, P. M., AND LUCAS, R. E.
Muck soil management for onion production.
Ext. Bull. Mich. St. Coll. **123**, revised 1955, pp. 48, illus.

2865.

a HEINEMANN, P.
Champignons récoltés au Congo Belge par Madame M. Goossens-Fontana. II. *Agaricus* Fries s.s. (**Mushrooms collected in the Belgian Congo by Madame M. Goossens-Fontana. II. *Agaricus* Fries s.s.**)
Bull. Jard. bot. Bruxelles, 1956, **26**: 1-127, bibl. 9+26, illus.
Descriptions of 40 spp. indicating which are edible.

b HILLMANN, W. S.
Injury of tomato plants by continuous light and unfavorable photoperiodic cycles.
Amer. J. Bot., 1956, **43**: 89-96, bibl. 17, illus.
For an earlier abstract see *H.A.*, 26: 701.

c HÖJBY, H.
Utilization of hybrid vigour in tomatoes.
Fmg S. Afr., 1956, **31**: 15-18, 28, illus.
Promising results with F_1 hybrids.

d JOUBERT, T. G. LA G.
Better onions for the Transvaal. (1) Aim and results of breeding.
Fmg S. Afr., 1956, **32**: 61, 63-8, illus.

e KALJTJA, A. JA.
Phosphorus nutrition of tomato plants. [Russian.]
Sad i Ogorod, 1956, No. 3, pp. 32-3.
Benefit of split application after appearance of 2nd leaf and 6th leaf.

f KENDRICK, J. B., JR., AND ALLARD, R. W.
Lima bean tolerant to stem rot.
Calif. Agric., 1955, **9**(10): 8, 15, illus.
Progeny of variety L-4 highly resistant to *Rhizoctonia solani*.

g KERR, E. A., AND KRIBS, L.
Electric vibrators as an aid in greenhouse tomato production.
Bienn. Rep. hort. Exp. Stat. Prod. Lab. [*Vineland*] *for 1953 and 1954*, pp. 55-60, bibl. 3, illus.
See H.A., 25: 4028.

h KLEIN, A. K., AND OTHERS.
Biological assay of endrin in leafy vegetables and its confirmation by paper chromatography.
J. Ass. off. agric. Chem. Wash., 1956, **39**: 242-53, bibl. 12, illus.

i KLEPAČ, A. G.
High tomato yields in glasshouses in the Far North. [Russian.]
Sad i Ogorod, 1956, No. 1, pp. 30-3, illus.
Cultural practices described.

j KNOBLAUCH, F.
Stammeforsøg med kepaløg 1952-54. (**Trials with onion varieties and strains 1952-54.**) [English summary 1¼ pp.]
Tidsskr. Planteavl, 1955, **59**: 601-17, bibl. 5.
In Denmark.

k KOSSWIG, W.
The problem of cucumber wilt.
Höfchen-Briefe (English edition), 1955, **8**: 150-67, bibl. 16, illus.
Methods of *Fusarium* control reviewed.

l KRISTENSEN, H. R., AND CHRISTENSEN, M.
Løg-mosaiksyge. (**The mosaic disease of shallots.**) [English summary ¾ p.]
Tidsskr. Planteavl, 1955, **59**: 530-47, bibl. 26, illus.
Incubation, transmission and testing bulbs for presence of virus.

m LAMM, R., TOMETORP, G., AND ÅVALL, H.
Klassificerande sort- och stamförsök med köksväxter 1952-54. (**Vegetable variety trials in Sweden 1952-54.**) [Summaries in English pp. 2½, and Esperanto p. 1.]
Medd. Trädgårdsförs. Malmö **90**, 1955, pp. 54, bibl. 14.

n MCCALLUM, D. W.
Garlic growing in Marlborough.
N.Z. J. Agric., 1956, **92**: 245-7, illus.
Wairau Plain, N.Z.

o MACCREARY, D., HEUBERGER, J. W., AND STEVENS, R. F.
Delaware's 1956 recommendations for insect and disease control on vegetables.
Ext. Folder Del. agric. Ext. Serv. **45**, 1956, 1 folded sheet.

p MILES, M.
That mystery maggot is carrot fly.
Grower, 1956, **45**: 1003, 1005.
On lettuce; a correction to earlier paper. See *H.A.*, 26: 1796.

q MINISTRY OF AGRICULTURE, LONDON.
Parsnips.
Adv. Leafl. Minist. Agric. Lond. **151**, revised 1955, pp. 3.

r MINISTRY OF AGRICULTURE, LONDON.
Red spider mite on glasshouse crops.
Adv. Leafl. Minist. Agric. Lond. **224**, revised 1955, pp. 9, illus.
Tetranychus telarius, mainly on tomatoes, cucumbers, french beans and carnations.

s MINISTRY OF AGRICULTURE, LONDON.
Brussels sprouts.
Adv. Leafl. Minist. Agric. Lond. **299**, revised 1955, pp. 6.

t MOTTS, G. N.
Cantaloupe grader's manual.
Slicing cucumber grader's manual.
Tomato grader's manual.
Ext. Folders Mich. St. Coll., **F-203**, **F-204**, **F-205**, 1955, each 1 folded sheet.
Michigan legislation on grading, packing and marketing.

u MULLIN, R. S.
Pepper diseases in Virginia.
Market Grs' J., 1956, **85**(2): 20.
And their control.

v MYRSTAD, A.
Sortsforsøk med veksthustomat 1955. **(Variety trials with glasshouse tomatoes 1955.)**
Gartneryrket, 1956, **46**: 19-20.
In Norway.

w OORT, A. J. P., AND DEKKER, J.
Inwendige zaadontsmetting met rimocidine, een antibioticum uit *Streptomyces rimosus*. **(Internal disinfection of seeds with rimocidin, an antibiotic from *Streptomyces rimosus*.)**
[English summary 1 p.]
Reprinted from *Meded. LandbHogesch. Gent*, 1955, **20**: 381-7, bibl. 6, as *Meded. Lab. Phytopath.* **152**.
For another account of the same work see *H.A.*, 26: 624.

x PARUNAKJAN, E. K.
Cucumber growing in glasshouses within the Arctic Circle. [Russian.]
Sad i Ogorod, 1956, No. 1, pp. 27-9, illus.

y PERSSON, A. R.
Forsøk noen nye sorter graskar. **(Trials with some new squash and vegetable marrow varieties.)**
Norsk Hagetid., 1955, **17**: 202-7, illus.
In Norway.

z REAR, J.
A report from California-Oregon on mechanized equipment for staking and stringing operations in beans and tomatoes.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 236-7.

2866.

a ROLL-HANSEN, J., AND VIBSTAD, A.
Sortsforsøk med veksthustomat på Kvithamar 1954-55. **(Variety trials with glasshouse tomatoes at Kvithamar 1954-55.)**
Gartneryrket, 1956, **46**: 125-8.

b ROMSHE, F. A., AND CORDNER, H. B.
Vegetable variety trials. Summary through 1954.
Bull. Okla. agric. Exp. Stat. **B-463**, 1955, pp. 15.

c RUBINS, E. J.
Molybdenum deficiencies in the United States.
Soil Sci., 1956, **81**: 191-7, bibl. 10 (plus numerous refs. in consolidated bibl. on pp. 243-58).
On vegetables and citrus.

d SANBORN, B. G.
Results of seed tests for 1955.
Bull. N.H. agric. Exp. Stat. **422**, 1955, pp. 35.
Including vegetable seeds from named firms.

e SCHOENEMANN, J. A., AND COMBS, O. B.
Growing cucumbers for pickling.
Circ. Univ. Wisc. Ext. Serv. **503**, 1955, pp. 8, illus.

f SERVICE DE L'HORTICULTURE, RABAT.
Note préliminaire sur l'influence de la fumure phosphorique et potassique sur certaines caractéristiques des tomates industrielles. **(Preliminary note on the effect of phosphoric and potassic fertilizers on certain characters of processing tomatoes.)**
Terre maroc., 1956, **30**: 8-11.
Manurial trials at 3 centres in Morocco and fertilizer recommendations.

g SHIBUTANI, S., AND OKAMURA, T.
Studies on the morphological characters of seeds in *Brassica*. [Japanese, with English summary 14 lines.]
J. hort. Ass. Japan, 1955, **24**: 195-8, bibl. 7, illus.
Shape, colour, size, surface network and seedcoat anatomy.

h SUTTON, W. S.
Yellow top disease of tomatoes.
Agric. Gaz. N.S.W., 1955, **66**: 655-8, illus.
Symptoms, distribution and transmission.

i THOMPSON, R. C., DOOLITTLE, S. P., AND CAFFREY, D. J.
Growing pumpkins and squashes.
Fmrs' Bull. U.S. Dep. Agric. **2086**, 1955, pp. 30, illus.

j TRAMIER, R.
Essais de dispersion de la bouillie bordelaise sur tomates. **(Tests on the particle distribution of bordeaux mixture on tomatoes.)**
Terre maroc., 1956, **30**: 130-3.
With low- and high-pressure sprayers.

k WAGGONER, P. E., AND DIMOND, A. E.
Altering disease resistance with ionizing radiation.
Phytopathology, 1956, **46**: 125-7, bibl. 10.
See *H.A.*, 25: 680.

l WARID, W. A.
Production of the onion bulb crop in Egypt.
[*Publ.*] *agric. Ext. Dep. Minist. Agric. Cairo*, 1955, pp. 6.

m WEIBULL, G.
The cold storage of vegetable seed—further studies.
Agri. hort. Genet., 1955, **13**: 121-42.
Earlier results confirmed [see *H.A.*, 23: 679 and 26: 538].

n WEISER, W.
Effect on *Meloidogyne hapla* of excised tomato roots treated with alpha-methoxy-phenylacetic acid.
Science, 1956, **123**: 374-5, bibl. 3.
A repellent effect on the nematode.

o WINDHAM, S. L.
Bell pepper variety tests.
Miss. Fm Res., 1955, **18**(12): 2.
Yolo wonder gave highest yields.

p WOLF, E. A., AND RUPRECHT, R. W.
Progress and problems in the development of an early-blight resistant celery for Florida.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 178-81, bibl. 6.

q WOLFENBARGER, D. O., AND VAN MIDDELEM, C. H.
Reductions of insecticidal residue on mature green-wrap tomatoes.
J. econ. Ent., 1955, **48**: 744-6, bibl. 10.
DDT, demeton, dilan, EPN, malathion, parathion and TDE residues.

r YAKUWA, T.
Studies on tillering in the genus *Allium*. II. On the mechanism of the second and subsequent tillerings of Welsh onion. [Japanese, with English summary ¼ p.]
J. hort. Ass. Japan, 1955, **24**: 189-94, bibl. 7, illus.
For Part I see *H.A.*, 25: 3197i.

s ZAUMEYER, W. J., AND WESTER, R. E.
Control of downy mildew of lima beans with streptomycin.
From abstr. in *Phytopathology*, 1956, **46**: 32.
It afforded excellent protection against *Phytophthora phaseoli*.

t ZEMLJANUHIN, A. A.
Seasonal changes in the vitamin content of some plants. [Russian.]
Agrobiologija, 1955, No. 2, pp. 136-7.
Ascorbic acid in sugar beets, cucumbers and cabbages.

TOBACCO.

General.

(*See also* 2908c, l.)

2867. U.S. DEPARTMENT OF AGRICULTURE, TOBACCO DIVISION.
Annual Reports on Tobacco Statistics, 1953, 1954, and 1955.
Statist. Bulls U.S. Dep. Agric., agric. Market. Serv. **138**, 1953, pp. 71; **157**, 1955, pp. 68, and **169**, 1956, pp. 70 respectively.
Statistics are presented on production, prices, stocks, manufactured products, tax rates, consumption, revenue, exports and imports of the various types of tobacco.

2868. REYNEKE, J.
Tobacco research. [Forming part of the Annual Report of the Secretary for Agriculture, Union of South Africa, for the year ended 31 August, 1955.]
Fmg S. Afr., 1956, **31**: 142-5, 154.
Work reported briefly includes: *Agro-climatological studies. Quality of flue-cured tobacco:* Chemical composition, deficiency diagnosis, sugar and N contents in relation to quality, time of picking in relation to composition. *Soil and soil fertility:* Effect of fertilizer on yield and composition. *Cultural practices:* Planting density in relation to quality, depth of irrigation in relation to root development and plant behaviour, sucker control. *Varieties. Pests and diseases.*

Cultural practices.

(*See also* 2361, 2363, 2408, 2416d, 2720, 2721, 2908e, j.)

2869. WILSON, R. W.
Factors affecting tobacco cultivation.
Tech. Bull. N.C. agric. Exp. Stat. **116**, 1955, pp. 28, bibl. 4, illus.
The results are presented of a series of experiments on the effects of cultivation on the yield and value of tobacco grown on 3 soil types. The treatments included no cultivation with and without chemical weed control, scraping with and without straw mulching, shallow cultivation with and without ridging or straw mulching, and deep cultivation with and without ridging. In general the results showed the following: (1) Mechanical soil disturbance is not beneficial to tobacco growth except on compact soils where a roughening of the soil surface is an advantage. (2) Deep cultivation does not improve yields. (3) Ridging at the time of the last cultivation is of benefit as an insurance against lodging of stalks by wind. (4) Uncontrolled weeds reduce growth more than any other factor.

2870. DE HONDT, H. A.
The effect of phosphorus rates for Maryland tobacco on the content of nitrogen fractions in the plant.
Diss. Abstr., 1955, **15**: 1962, being *Publ.* 14186 of 90 pp.
Four rates of P were applied annually as treble superphosphate to plots of the Robinson variety of Maryland Medium Broadleaf tobacco plants. P was beneficial to yield and quality and to early flowering. In 2 of the 3 seasons studied total N decreased as P_2O_5 increased up to 90 lb. per acre, but increased again at 180 lb. per acre. In the third season when late rainfall was above normal following an early moisture deficiency, the trend in total N content was reversed. In the 2 years in which acid insoluble N was analysed the content decreased with P_2O_5 increases at first, but increased at 180 lb. per acre. Total alkaloids and nornicotine increased with increased P_2O_5, while nicotine remained constant. In the plant, distribution of total N, acid insoluble N, free ammonia and

asparagine increased from the bottom to the top. Total alkaloids, nicotine and nornicotine reached their maximum just above the middle of the plant, and above this point nornicotine decreased, while total alkaloids and nicotine remained constant. Glutamine was not affected by leaf position.

2871. Schmid, K.
Der Einfluss der Phosphorsäure-Versorgung auf das Jugendwachstum des Tabaks. (**The influence of phosphoric acid fertilization on the juvenile stage of tobacco.**)
Dtsch. Tabakb., 1955, **35**(10): 75-6, from *Abstract Card Inst. Tabakforsch., Dresden*, No. 56/147.
It was found that for tobacco grown in 3 different soils an abundant supply of P_2O_5 (2·5 g./pot) was required for good development of the juvenile stage. Band application was not satisfactory.

2872. Bennett, R. R., and others.
Field irrigation of tobacco.
Ext. Circ. N.C. agric. Ext. Serv. **388**, 1955, pp. 36, illus.
This circular comprises 4 articles entitled "Some tobacco irrigation principles", "Black shank and irrigation", "Irrigation rental agreement" and "Water supply and equipment".

2873. Witte, K.
Untersuchungen zur Frage der Frostabwehr durch Beregnung. (**Studies on the problem of frost protection by irrigation.**)
Wasser u. Boden, 1951, **3**: 83-9, from abstr. in *Bibl. dtsch. Wetterdienst* **3**, 1955, No. 639.
Sprinkler irrigation has protected tobacco from frosts of −12·5° C., while other crops have been protected against −4° to −5° C. A nozzle of 1 mm. diameter began to freeze at −9° C. The Perrot-Langsamregner, with a 5 mm. nozzle, was the best of the irrigation units studied, but it is not ideal.

2874. Vitoveckiĭ, M. M.
Producing supplementary yields of tobacco on axillary shoots. [Russian.]
Tabak, 1955, **16**(4): 53-4.
Data are presented showing that by retaining 1 side shoot with 6–8 leaves or 3 shoots each with 3–4 leaves tobacco yields were increased without detriment to quality.

2875. Bolsunov, I.
Behandlung des Stengelphloems zur Beschleunigung der Reifung und zur Erhöhung des Zuckergehaltes der Blätter der hellen Virginia-Tabake.) (**Treatment of stalk phloem to hasten ripening and increase sugar content of the leaves of Virginia-Bright tobacco.**) [English summary ½ p.]
Reprinted from *Fachl. Mitt. österr. Tabakregie*, 1955, Heft 2, pp. 13, bibl. 13, illus.
The effect of ringing the stems after topping was observed on different tobacco types. In treated plants of the Hungarian variety Sabolz ripening was accelerated by almost a week, although yields were lower than from control plants. In air-cured leaves from treated plants the sugar content was up to twice as high as that from the control plants; leaf protein content was reduced by ringing. Nicotine content was slightly reduced by the treatment. In 1953 plants of flue-cured Virginia Bright tobacco were ringed after priming. Treated plants ripened 4–6 days earlier than control plants. The middle leaves after curing contained about 1·5% less protein and 3·4% more sugar than corresponding leaves from control plants. Similar results were obtained in 1954. In other types of air-cured tobaccos similar, but less marked effects were apparent.

2876. Suggs, C. W.
"Easier on the heart".
Res. and Fmg N.C., Summer and Autumn, 1955, p. 3, illus.
Research in North Carolina has shown that priming tobacco is 2¼ times less fatiguing to the operator if he is sitting on a moving machine than if he is walking, and his average priming speed is approximately 20% greater. The accuracy with which ripe leaves were selected did not vary appreciably between sitting and walking operators.

Growth phenomena.

2877. Tejwani, K. G., Kurup, C. K. R., and Venkataraman, K. V.
Growth characteristics of cigar tobacco plant.
Indian Tobacco, 1955, **5**: 183-6, illus.
An irrigated crop of the Vellavazhai cigar variety was weeded 3 weeks after transplanting, cultivated and earthed up at 6 weeks, topped to 14 leaves at 10 and harvested at 13 weeks. Green and dry matter weights were recorded at weekly intervals. The chief results and conclusions were: (1) Little growth took place during the first 6 weeks. (2) The maximum green and dry weight increases in leaf and total plant were produced in the 9th and 10th weeks. (3) The most rapid increase in green stalk weight occurred in the 10th week. (4) In the 7th–10th weeks more than 60% of the total leaf area, 50–60% of the leaves and 60% of the total dry matter were produced. More detailed results are to be published elsewhere.—Tobacco Res. Stat., Vedasandur.

2878. Maróti, M., and Frenyó, V.
Megporzás kísérletek dohányokon. (**Pollination tests on tobacco plants.**)
Bot. Közl., 1955, **1-2**: 39-44, from English abstract in *Hung. agric. Rev.*, 1955, **4**(4): 4-5.
Tobacco flowers were emasculated and pollinated and each stigma received about 35 pollen grains. In 2 pollination tests 22 and 25 ripe seeds per capsule developed in Heves tobacco. In coarse tobacco the average was 30 seeds per capsule. In other experiments where stamens and/or stigmas were removed, parthenocarpy occurred only on one occasion in Muscat, Garden and *Nicotiana rustica* plants. Parthenogenesis was not observed.

2879. Böjthe, G., Jr.
Vizsgálatok a dohány megtermékenyüléséről a heterózis-mag előállításával kapesolatban. **(Investigations on the fertilization of tobacco in connection with hybrid (heterosis) seed production.)**
Dohányipar, Budapest, 1955, **5-6**: 19-23, from English abstract in *Hung. agric. Rev.*, 1955, **4**(4): 5.

A close interrelationship was found between the numbers of seeds obtained and of the fertilizing pollen. With the varieties Rétháti-77 and Debreceni artificial pollination was more successful than natural fertilization; seed yield after artificial pollination was 80·64 g. compared with 3·3 g. from open pollination. Seed weight was affected by the number of capsules left on the plant, and decreased in inverse ratio to increased capsule number. There was little blossom shedding after emasculation.

2880. Čirkovskiĭ, V. I.
The problem of germination of freshly harvested tobacco seeds. [Russian.]
Agrobiologija, 1955, No. 5, pp. 146-8.
Increased germination of freshly harvested tobacco seeds. [Russian.]
Tabak, 1956, **17**(1): 30-1, bibl. 1.

Post-harvest dormancy in tobacco seeds was overcome most effectively by a mild heat treatment for 1 or 2 months at 25–30° C. and 60–75% relative humidity.

Physiology and biochemistry.

(*See also* 2369-2372, 2377, 2908i, k, m-o.)

2881. Tombesi, L.
Andamento di alcune attività enzimatiche e del contenuto in chetoacidi, N proteico, glucosio, amido ed acido citrico durante le fasi del ciclo vegetativo di *Nicotiana tabacum* var. Sumatra. **(Enzyme activity and contents of keto-acids, protein nitrogen, glucose, starch and citric acid at different phases of the life cycle of *Nicotiana tabacum* var. Sumatra.)**
Tabacco, 1955, **59**: 383-92, bibl. 4.

Data on the biosynthesis of certain compounds in Sumatra tobacco are presented and are discussed in relation to those of 3 other varieties previously investigated (see *H.A.*, 26: 770, 771 and 1865]. The chief results and conclusions are: (1) The protein N content is high in Sumatra and Kentucky and low in Xanthi and Virginia Bright; (2) the citric acid content is highest in Sumatra followed, in descending order, by Xanthi, Kentucky and Virginia Bright; and (3) in Sumatra catalase, phenoloxidase and carbohydrase activity increase during the life cycle up to anthesis and seed formation.—Ist. Chim. agrar., Roma.

2882. Vittorio, P. V., and others.
The products of starch hydrolysis and their metabolism.
Canad. J. Bot., 1956, **34**: 209-13, bibl. 4, illus.

C^{14} labelled tobacco leaf starch digested with 1*N* H_2SO_4 in a boiling water bath was not completely hydrolyzed to glucose even after 24 hrs. After three hours' hydrolysis, paper partition chromatography with butanol-ethanol-water solvent revealed that besides glucose there were four C^{14} labelled products with R_F values lower than glucose. When these bands were fed individually to tobacco leaves in light they were incorporated into sucrose, glucose, fructose and starch, and were better starch formers than glucose, glucose-1-phosphate or maltose. [Authors' abstract.]—Defence Res. Bd, Kingston Lab., Kingston, Ont.

2883. Palmer, J. K.
Occurrence of D-glyceric acid in tobacco leaves.
Science, 1956, **123**: 415, bibl. 10.

The isolation of D-glyceric acid from mature green leaves of shade-grown tobacco is described, and chemical proof of its identity and configuration is given.—Conn. agric. Exp. Stat., New Haven.

2884. Byerrum, R. U., and others.
The utilization of glycolic acid for methyl group synthesis in tobacco.
J. biol. Chem., 1956, **219**: 345-50, bibl. 14.

The α-carbon of glycolic acid served as a precursor for the *N*-methyl group of nicotine and the *O*-methyl groups of lignin in tobacco plant metabolism. Formate did not appear to be an intermediate in the pathway of incorporation of glycolate α-carbon into methyl groups. [Authors' summary.]—Mich. St. Univ., E. Lansing.

2885. Jeffrey, R. N., and Eoff, W. H.
Paper chromatographic method for determining alkaloids in tobacco.
Analyt. Chem., 1955, **27**: 1903-5, bibl. 12.

A method of determining the kinds of alkaloids and their approximate amounts in tobacco and related species of *Nicotiana* is described. This method is designed for the analysis of the large number of samples required in a plant-breeding programme. Sufficient accuracy for this purpose is obtained by visual comparison with known spots after separation by paper chromatography. [From authors' abstract.] —Agric. Res. Serv., U.S. Dep. Agric., Beltsville, Md.

2886. Mikhailov, M. K.
Division and determination of organic acids in tobacco by filter paper chromatography. [Russian summary 8 lines.]
C.R. Acad. bulg. Sci., 1955, **8**(1): 45-8, bibl. 10.

Citric acid, malic acid and oxalic acid have been identified in extracts from Bulgarian tobacco. Tobacco quality decreased as the content of citric acid increased. —Univ. Stalin, Bulgaria.

2887. Vickery, H. B., and Palmer, J. K.
The metabolism of the organic acids of tobacco leaves. X. Effect of culture of excised leaves in solutions of fumarate and maleate.
J. biol. Chem., 1956, **218**: 225-39, bibl. 18.

Fumaric acid and maleic acid were made available in 0·2 M solution at pH 5·0 and 6·0 to tobacco leaves (*Nicotiana tabacum* var. Connecticut shade-grown) by means of the excised leaf culture technique. Succinic acid was similarly administered as a positive control.

Fumaric acid was taken up somewhat less freely than succinic acid and about one-half of the quantity acquired by the leaves was metabolized, citric acid being almost the exclusive product. Maleic acid was taken up considerably more freely than succinic acid and the greater part was found unchanged in the tissues. Although a small contribution to the formation of citric acid appears to have been made, much of that part of the maleic acid which was metabolized was converted into substances the identity of which has not yet been established. Maleic acid present in the tissue apparently behaved as an inhibitor of the activity of the proteolytic enzymes and of the enzyme systems concerned with the formation of citric acid. It also appeared to have interfered with the utilization of malic acid in the transformations that normally occur. The inference may be drawn that the presence of active thiol groups is essential for these activities. [Authors' summary.]—Conn. agric. Exp. Stat., New Haven. [For part IX see *H.A.*, 26: 1874.]

2888. Arnaud, J., and others.
Action de l'hydrazide maléique sur l'élaboration des glucides par les feuilles de tabac. (Effect of maleic hydrazide on the elaboration of soluble carbohydrates by tobacco leaves.)
C.R. Acad. Agric. Fr., 1956, **42**: 168-71, bibl. 3.

In Paraguay tobacco plants, in which the application of MH to the topping wound in July had completely inhibited suckering, starch and sugar contents were found, one month later, to have increased considerably in the upper leaves and to a smaller extent in the lower leaves. The starch contents of the upper and lower leaves, respectively, were 9·0 and 1·25 g./100 g. D.M. compared with 1·6 and 0·42 g. in the controls. The corresponding total sugars contents were 15·02 and 6·49 g., respectively, compared with 5·44 and 2·8 g. in the controls.

2889. Vlitos, A. J., Meudt, W., and Beimler, R.
A new unidentified indole hormone in Maryland Mammoth tobacco.
Nature, 1956, **177**: 890-1, bibl. 3.

Paper-chromatographic investigations on the effect of γ-radiation on the endogenous level of the indole compounds occurring naturally in leaf, stem, root and apical tissues of Maryland Mammoth tobacco led to the discovery in the leaf and apical extracts of an unidentified indole compound of which the R_F values and some of the properties are given.—Boyce Thompson Inst. Plant Res., Yonkers, N.Y.

Diseases and pests.

(*See also* 2908a, b, d, f-h, p-r.)

2890. Anon.
Mysterious disease causing considerable damage.
Fmg S. Afr., 1956, **32**: 53-4, 75-6, illus.

Symptoms of an unidentified tobacco disease, known as fern-leaf or guinea fowl disease among the farmers, become apparent after curing when numerous brown specks appear. A relationship between sugar content of the leaf and incidence of the disease has been observed. Experiments have shown that the leaves of tobacco plants receiving low amounts of sunlight with cool nights contain an excess of N and insufficient sugar. The possibility that the disease might be promoted by unsuitable weather conditions is being investigated.

2891. Bancroft, J. B., and Pound, G. S.
Cumulative concentrations of tobacco mosaic virus in tobacco and tomato at different temperatures.
Virology, 1956, **2**: 29-43, bibl. 15, illus.

When tobacco and tomato leaves were inoculated with TMV, the virus concentration increased initially with increases in air and soil temperature. Subsequently the highest TMV concentrations in susceptible tomato and tobacco varieties were found at different temperatures over a period of time, the time interval after inoculation being critical. In air and soil experiments with TMV in a resistant tobacco variety the highest concentrations occurred at the highest temperatures. —Univ. Wisconsin, Madison. [See also *H.A.*, 25: 723.]

2892. Pound, G. S., and Bancroft, J. B.
Cumulative concentrations of tobacco mosaic virus in tobacco at different photoperiods and light intensities.
Virology, 1956, **2**: 44-56, bibl. 13.

A study of the post-inoculation effect of light on the multiplication of TMV in inoculated tobacco leaves on growing plants showed that long days and high light intensities favoured multiplication more than did short days and low light intensities.—Univ. Wisconsin, Madison.

2893. Matthews, R. E. F.
Thiouracil in tobacco mosaic virus.
Biochim. biophys. Acta, 1956, **19**: 559, bibl. 8.

Experiments, in which S^{35}-labelled thiouracil was applied to detached, TMV-infected tobacco leaves cultured in saline solution, led to the conclusion that the thiouracil was incorporated into polynucleotides of the TMV ribonucleic acid.—A.R.C. Virus Res. Unit, Molteno Inst., Cambridge.

2894. Rhodes, G. N., Mullett, R. P., and Matthews, J. N.
Results of wildfire test demonstration control treatments with streptomycin sulfate.
Plant Dis. Reptr, 1956, **40**: 202-4, bibl. 2.

As a preventive treatment against wildfire (*Pseudomonas tabaci*) in tobacco plant beds a streptomycin spray solution at 100 p.p.m. was superior to the standard copper drench. A 0·2% dust at 1½ lb. per 9×100 ft. bed apparently retarded infection. In eradication tests, a 200 p.p.m. streptomycin spray eradicated all visible active wildfire in naturally infected beds, the 0·2% dust treatment being slightly less effective. Some plants in these beds showed temporary bleaching. The preventive streptomycin spray greatly accelerated the growth of algae in some beds; but a standard copper drench controlled them.—Tenn. agric Exp. Stat., Knoxville.

2895. Shaw, L., and Thorne, G. W., Jr.
Wildfire control studies in Burley tobacco plant beds in North Carolina in 1955.
Plant Dis. Reptr, 1956, **40**: 325-7, bibl. 3.

Different formulations of streptomycin sprays and dusts and Terramycin sprays were tested along with standard copper drench treatments for wildfire (*Pseudomonas tabaci*) control on inoculated burley tobacco seedlings in the plant bed. Streptomycin sprays at 200 p.p.m. and 5 or 10 gal. per 100 sq. yd. and dusts at 1,000–4,000 p.p.m. and 3–4 lb. per 100 sq. yd. gave good to excellent control when 4 applications 1 week apart were started immediately after inoculation. Three sprays beginning a week after inoculation were as effective as 4 beginning immediately after inoculation. Spray treatments with Terramycin and standard copper drench treatments were substantially less effective.—Agric. Res. Serv., U.S. Dep. Agric., and N.C. Exp. Stat., Waynesville.

2896. Braun, A. C.
A study on the mode of action of the wildfire toxin.
Phytopathology, 1955, **45**: 659-64, bibl. 22, illus.

Physiological and chemical studies indicate that the bacterial toxin associated with the wildfire disease of tobacco is a structural analogue of methionine that owes its biological activity in one and perhaps all susceptible plant species to its behaviour as a naturally occurring antimetabolite of that essential amino acid. [From author's summary.]—Rockefeller Inst. med. Res., New York.

2897. Lucas, G. B., and Krusberg, L. R.
The relationship of the stunt nematode to Granville wilt resistance in tobacco.
Plant Dis. Reptr, 1956, **40**: 150-2, bibl. 7.

Greenhouse experiments indicated that *Tylenchorhynchus claytoni* did not increase severity of bacterial wilt (*Xanthomonas solanacearum*) in wilt-resistant tobacco plants grown in soil infested with both pathogens. [Authors' abstract.]—N.C. St. Coll., Raleigh.

2898. Holdeman, Q. L.
The effect of the tobacco stunt nematode on the incidence of *Fusarium* wilt in flue-cured tobacco.
Phytopathology, 1956, **46**: 129, bibl. 4.

Greenhouse experiments showed that the tobacco stunt nematode (*Tylenchorhynchus claytoni*) is capable of increasing the incidence of wilt in the susceptible tobacco variety Oxford 1-181. It seems probable that this nematode is one of the factors responsible for the erratic behaviour of *Fusarium* wilt of tobacco in the field.—Pee Dee Exp. Stat., Florence, S.C.

2899. Hauser, J.
Minőségi dohánytermelés alapfeltételei. **(Essential conditions for growing high quality tobacco.)**
Dohányipar, 1955, **1-2**: 3-7, from English abstract in *Hungarian agric. Rev.*, 1955, **4**(3): 5.

Basic principles in raising tobacco seedlings are outlined. The most serious fungus disease in the seedbed is *Thielavia basicola*. In general, susceptibility to the disease was greater in varieties with small root systems. Hercegovina showed the lowest infection (13%) of 5 varieties tested.

2900. Segall, R. H., and López-Matos, L.
Control of damping-off of tobacco in seedbeds by the use of gaseous soil fumigants. [Spanish summary ½ p.]
J. Agric. Univ. Puerto Rico, 1956, **40**: 62-6, bibl. 15.

The damping-off of tobacco grown in seedbeds in Puerto Rico is caused mainly by *Phytophthora parasitica*, *Pythium debaryanum*, and *Pellicularia filamentosa* (*Rhizoctonia* [*Corticium*] *solani*). Two types of damping-off are known: pre-emergence and post-emergence. Recent experiments with methyl bromide and with chloropicrin aerosols show that: (1) They are more effective against post-emergence damping-off than the fungicides previously recommended and also increase emergence. (2) Their herbicidal properties against nutgrass and other plants obviate the need for hand weeding. (3) One application at 2 lb. per 100 sq. ft. under a tarpaulin for 48 hours should be made 1 to 3 weeks before sowing. (4) Soil fumigation is economically feasible. (5) Six weekly drenches with 2 lb. copper oxychloride per 100 gal. water at 6 gal. per 100 sq. ft. beginning 3 weeks after sowing increase control.

2901. Graham, T. W.
Diffusion of soil fumigants in tobacco row treatments.
From abstr. in *Phytopathology*, 1956, **46**: 13.

D-D and EDB were applied at the bottom of a 6-in. furrow and covered to a depth of 10 in. Sampling based on nematode counts after a week showed that there was an effective zone of fumigation for 8–12 in. horizontally on each side of the injection and an 8-in. arc above.

2902. Stein, L. H., and Smith, A. J.
Uptake and degradation of labelled systemic insecticides. Part II—Treatment of tobacco and potatoes with Systox.
Reprinted from *J. S. Afr. chem. Inst.*, 1954, **7**: 114-19, bibl. 4.

After spraying tobacco with labelled Systox the concentration decreased rapidly and had reached a low value (2·99 p.p.m. dry weight) 28 days later. Soil applications were absorbed by the plants continuously over long periods.

Curing and fermentation.

2903. Sastry, A. S.
A comparative chemical study of flue-curing and shade-curing of Virginia tobacco.
Proc. Indian Acad. Sci. Sect. B, 1956, **43**: 110-20, bibl. 10.

In a study of biochemical changes during curing, samples of Harrison Special, a flue-cured variety, were subjected to either flue-curing or shade-curing. During the first 40 hours, which corresponded to the yellowing stage of flue-curing, the leaf was at a higher temperature and humidity in flue-curing than in shade-curing. This resulted in quicker chemical reactions in flue-curing than in shade-curing. The leaf was completely yellow at the end of 40 hours in flue-curing, while it was only 75% yellow at the end of 123 hours in shade-curing. Also there was greater hydrolysis of starch, more production of sugars and

greater loss of solids in flue-curing. The contribution of carbohydrates to respiratory losses in the early stages was more in flue-curing than in shade-curing, showing that non-carbohydrate constituents contributed relatively more to these losses in shade-curing. Probably because of this there was considerable loss of nitrogen under shade-curing, whereas the changes in nitrogen during flue-curing were insignificant. [From author's summary.]—Tobacco Res. Stat., Vedasandur.

2904. Wöber, O., and Perucci, E.
Sul colore dei tabacchi subtropicali da fascia. **(On the colour of subtropical wrapper tobacco.)**
Tabacco, 1955, **59**: 415-17 and 417-31, bibl. 1.
Criticism by Wöber of the practice of midrib incision as an aid to curing [see *H.A.*, 25: 734] is followed by a defence of the method by Perucci.

2905. Petrenko, A. G., and Mišareva, N. T.
Fumigation with smoke as means of controlling mould on tobacco. [Russian.]
Tabak, 1955, **16**(4): 39-40.
Fumigation with smoke increased the resistance of cigar tobacco to bacterial and fungal moulds during curing and subsequent storage. Smoke from oak or walnut leaves was better than that from wormwood or from pine sawdust or needles and fumigation for 5 days better than for 3 days. The treatment also improved smoking quality.

2906. Bartolucci, A.
Importanza di alcuni fattori determinanti la fermentazione extra stagionale dei tabacchi orientali. **(The importance of certain factors in the controlled fermentation of oriental tobaccos.)** [English summary 7 lines.]
Tabacco, 1955, **59**: 393-403, bibl. 2, illus.
The factors discussed are: (1) Air conditioning where the climate is unsuitable for fermentation under uncontrolled conditions of temperature and humidity; (2) a sufficiently low density of baling to preclude injury to leaf; and (3) the correct regulation of temperature and humidity cycles.—Ist. sci. sper. Tabacchi, Sez. salentina, Lecce.

2907. Giovannozzi, M.
Studi sulla fermentazione dei tabacchi. XV Nota—Variazoni chimiche dei tabacchi orientali in conseguenza della fermentazione extra-stagionale e di quella stagionale. **(Studies on the fermentation of tobaccos. XV. Chemical changes in oriental tobaccos during controlled and uncontrolled fermentation.)** [English summary 9 lines.]
Tabacco, 1955, **59**: 371-82, bibl. 3.
During 1948/52 sun-cured Erzegovina [Hercegovina] tobacco was fermented either at 47–53° C. and 60–80% R.H. for 25 days or under uncontrolled conditions for 45–60 days, and a study was made of the changes in total and protein N, nicotine, reducing and non-reducing sugars and Ca. The chief results and conclusions were: (1) Greater changes resulted from controlled than from uncontrolled fermentation; (2) losses of dry matter were 2·02 and 0·65% in controlled and uncontrolled fermentation respectively; (3) in controlled fermentation losses in reducing sugars rose from 7·79% after 5 days to a final value of 20·0%, compared with 2·3% in uncontrolled fermentation; and (4) non-reducing sugars, absent in unfermented tobacco, amounted to 0·36% D.M. after both controlled and uncontrolled fermentation.—Lab. Zimol., Roma.

Noted.

2908.

a Caffrey, D. J.
Hornworms on tobacco, how to control them.
Leafl. U.S. Dep. Agric. **399**, 1956, pp. 5, illus.
Biology and control of *Protoparce sexta* and *P. quinquemaculata.*

b Dominick, C. B.
Green June beetle larvae: control in tobacco plant-beds.
Bull. Va agric. Exp. Stat. **454**, 1952, pp. 15, bibl. 4, illus. [received 1956].
For more recent investigations see *H.A.*, 26: 1899.

c Gopinath, D. M., and Hrishi, N. J.
Morphological classification of chewing tobaccos of the Madras State.
Indian Tobacco, 1955, **5**: 187-91, illus.
Ten types are described.

d Holdeman, Q. L., and Burkholder, W. H.
The identity of barn rots of flue-cured tobacco in South Carolina.
Phytopathology, 1956, **46**: 69-72, bibl. 10, illus.
Soft rots caused by *Pythium aphanidermatum* and *Erwinia aroideae* in wet seasons.

e Jakovuk, A. S.
On the time of sowing tobacco seeds. [Russian.]
Tabak, 1955, **16**(4): 55-7.
In Russia under glass in February.

f Lauffer, M. A., Trkula, D., and Buzzell, A.
Mechanism of inactivation of tobacco mosaic virus by X-rays.
Nature, 1956, **177**: 890, bibl. 6.

g Marcelli, E.
Osservazioni su di una nuova virosi del tabacco trasmissibile per seme. **(Notes on a new tobacco virus transmissible by seed.)** [English summary 7 lines.]
Tabacco, 1955, **59**: 404-9, bibl. 13, illus.
Yellow ringspot symptoms on Virginia Bright.

h Newmark, P., and Fraser, D.
Composition of an abnormal protein present in tobacco plants infected with tobacco mosaic virus.
J. Amer. chem. Soc., 1956, **78**: 1588-90, bibl. 16.

i PORTER, H. K., AND RUNECKLES, V. C.
Some effects of 2,4-dinitrophenol on the metabolism of tobacco leaf disks.
Biochim. biophys. Acta, 1956, **20**: 100-8, bibl. 14.
Advance abstract noted previously in *H.A.*, 25: 3026i.

j OSELEDEC, N. N.
A vetch-rye cover crop. [Russian.]
Tabak, 1955, **16**(4): 53.
Vicia villosa+rye as a winter green manure crop for light tobacco soils.

k PALMER, J. K.
Chemical investigations of the tobacco plant. X. Determination of organic acids by ion exchange chromatography.
Bull. Conn. agric. Exp. Stat. **589**, 1955, pp. 31, bibl. 21, illus.

l PERDOMO, J. E.
El veguero cubano. (**The Cuban tobacco grower.**)
Rev. Agric. Habana, September 1954 to March 1956, pp. 44-50, illus.
Brief notes on tobacco growing in Cuba.

m PUZZILLI, M.
La pressione osmotica nel tabacco var. Kentucky cimato e fiorito. (**Osmotic pressures in topped and in flowering Kentucky tobacco.**) [English summary 10 lines.]
Tabacco, 1955, **59**: 410-13.
Pressures were not significantly different.

n PYRIKI, C., AND HOMANN, W. F.
Zur Frage der Verteilung der wasserdampfflüchtigen Alkaloide in den Organen von *Nicotiana*-Arten und ihre Abhängigkeit vom Entwicklungszustand der Pflanze. (**The distribution of steam-volatile alkaloids in the organs of *Nicotiana* spp. amd their relationship to the stage of development of the plant.**)
Pharmazie, 1955, **10**: 195-204, from abstr. in *Biol. Abstr., Sect. D*, 1956, **30**, No. 8575.

o SCHOCH, K.
Quantitative Erfassung der kutikularen Rekretion von K und Ca. (**The quantitative determination of the cuticular excretion of K and Ca.**
Ber. Schweiz. bot. Ges., 1955, **65**: 205, from *Abstract Card Inst. Tabakforsch., Dresden*, No. 56/148.
When tobacco leaves are immersed in water.

p SHAW, M., AND SAMBORSKI, D. J.
The physiology of host-parasite relations. I. The accumulation of radioactive substances at infections of facultative and obligate parasites including tobacco mosaic virus.
Canad. J. Bot., 1956, **34**: 389-405, bibl. 20, illus.
Value of tracer techniques indicated.

q SIEGEL, A., AND WILDMAN, S. G.
The early time course of tobacco mosaic virus infection.
From abstr. in *Phytopathology*, 1955, **45**: 695-6.

r SIEGEL, A., AND WILDMAN, S. G.
The inactivation of the infectious centers of tobacco mosaic virus by ultraviolet light.
Virology, 1956, **2**: 69-82, bibl. 17.
Studies on treatment following inoculation.

MISCELLANEOUS TEMPERATE AND TROPICAL PLANTS.

Culinary and spice plants.

(*See also* 2406, 2410, 2948g, p, q, 3218.)

2909. KOYAMU, K., AND ALBUQUERQUE, S. D. S.
Pepper in coconut gardens.
Bull. Indian centr. Coconut Cttee, 1956, **9**: 159-60.
In experiments in 1952/55 black pepper, especially the Kalluvalli variety, gave good results as an intercrop in coconut plantations. Cultural recommendations are made.—Agric. Res. Stat., Pilicode, Madras.

2910. KURUP, P. G.
A new way of raising pepper vines.
Indian Fmg, 1956, **5**(12): 21-2.
An account is given of successful trials at the Pepper Research Station, Panniyur, on the propagation of black pepper (*Piper nigrum*] from vertically planted, single-node cuttings, with about 2 ins. stem above and below the nodes and with leaves attached. Cuttings without leaves started growth more rapidly, but the percentage success was lower.

2911. VEYRET, Y.
Embryogénie du genre *Vanilla*. Développement de l'embryon chez le *Vanilla fragrans* (Salisb.) Ames. (**Embryogenesis in the genus *Vanilla*. Development of the embryo in *V. fragrans*.**) [English and Spanish summaries 4 lines each.]
Agron. trop., 1956, **11**: 103-5, bibl. 6, illus.
This is the first paper of a series on embryogenesis in the Orchidaceae, with particular reference to *Vanilla* spp. The stages of embryo development in *V. fragrans* are described briefly with the aid of diagrams.

Drug plants.

(*See also* 2948c, e, u, w, 2990.)

2912. KHAN, A. H.
The present status and scope of exploitation of pharmacopoeial and *unani* medicinal plants in forests and under agriculture.
Pakistan Rev. Agric., 1956, **2**: 127-31, 160-9.
The lists of medicinal plants presented include 20 species found in the forests of Pakistan, 18 under cultivation and 205 used in the *unani* system of indigenous medicine.

2913. Reinouts van Haga, P.
The biogenesis of tropane alkaloids.
Biochim. biophys. Acta, 1956, **19**: 562, bibl. 2.

The hypothesis is advanced that ornithine is a precursor of both scopolamine and hyoscyamine. An indication of this was obtained in experiments with sterile root cultures of *Atropa belladonna*. Feeding ornithine resulted in an increase in alkaloid content from 0·4% dry weight in controls to 0·8% and chromatographic analysis showed that both alkaloids had increased.—Tech. Univ., Delft.

2914. Kennedy, D. R.
Newer solvents in drug extraction.
Diss. Abstr., 1955, **15**: 2171, being *Publ.* 14317 of 70 pp.

In a centrifuge method used to extract the alkaloid from powdered belladonna root, isopropyl and n-propyl alcohol were about as effective as ethyl alcohol, when combined with a small volume of water to form the menstruum. The use of acetone in the extraction menstruum appeared to decrease the amount of total matter extracted by the solution.

2915. Srivastava, G. S.
Propagation of *Cissampelos pareira* Linn. by root cuttings.
Sci. and Cult., 1956, **21**: 601-3, bibl. 5.

Variations in the content of the drug hayatinin in the roots of *C. pareira* suggest the need for multiplying selected clones vegetatively. Propagation by cuttings 1 in. in length taken from the tap root proved feasible, the best results (66%) being obtained with sections 0·31–0·40 cm. in diameter planted at the beginning of the monsoon. Cuttings that were either smaller or larger in diameter were less successful, and in the case of the latter this may be due to the accumulation of less starch in the relatively thick, upper portion of the tap root.

2916. Anon.
Taming the wild yam.
Agric. Res. Wash., 1956, **4**(7): 8-9, illus.

Species of *Dioscorea* have been collected from America, India and Africa and are being tested and selected for cultivation. Some yield up to 10% diosgenin, from which cortisone is prepared. It is believed that some of these high-yielding wild yams can be grown successfully in the southern United States and in Puerto Rico.

2917. Hlaváčková, Z.
Šlechtění maku na zvýšený obsah morfinu.
(Poppy breeding for increased morphine content.) [Russian and German summaries 1 p. each.]
Preslia, 1955, **27**: 368-82, bibl. 40, illus.

Czechoslovak varieties of *Papaver somniferum* grown under suitable conditions have a relatively high morphine content. The highest morphine content was found in the Dutch variety Nordster, whereas Bulgarian poppies, under Czechoslovak conditions, contained relatively low amounts of this alkaloid.

2918. Mika, E. S.
Studies on the growth and development and morphine content of opium poppy.
Bot. Gaz., 1955, **116**: 323-39, bibl. 27, illus.

The growth, development and morphine content of Yuma poppy, U.S.D.A. No. 17 (*Papaver somniferum*), grown under normal greenhouse conditions was compared with that of plants grown under controlled temperatures and photoperiods. When plants were grown in photoperiods of 8 hours after germination, followed by 18-hour days from the 49th to the 59th day after germination and then by natural daylength, the capsules contained more morphine than other plant organs, and the seeds contained none. Capsules collected at 98 days after germination contained the highest concentration of morphine, while those collected after 126 days contained the greatest amount of morphine (concentration × dry weight). Under certain controlled conditions the average number of nodes produced was related to the average dry weight of the capsule. The number of nodes was directly proportional to capsule dry weight in plants placed in 18-hour photoperiods 14, 30, 45 or 64 days after germination. A relationship was found between the mean number of nodes produced and daily photoperiods above 9 hours. The concentration of morphine in capsules and roots was greater in plants grown at 50° F., but at 70° F. the morphine content of the straw (stems plus leaves) was greater. At 70° F. the total dry weight of the capsules was greater, but at 50° F. the dry weight of the straw and roots was greater. Plants induced to flower after fourteen 18-hour photoperiods produced the highest shoot dry weight when the day temperature was 65° F. followed by a night temperature of 48° F. At high night temperatures the time to flowering was shortened, and the rate of flowering and morphine concentration increased to a greater extent than at lower night temperatures, but height, dry weight, length of peduncle and leaf area were greater at low night temperatures. Flower induction was inhibited at 84° F. during the supplemental light period when plants were given photoperiods between 14 and 18 hours for 54 days.

2919. Koperžinskiĭ, V. V., and Šeberstov, V. V.
Absorption and distribution of labelled phosphorus applied for foliar nutrition of the opium poppy. [Russian.]
Doklady Akad. Nauk. S.S.S.R., 1956, **106**: 1061-4, bibl. 16, illus.

A P^{32} labelled phosphate fertilizer was applied as a spray to the 4 or 5 upper, middle or lower leaves of flowering poppy plants. Tracer studies showed that the P^{32} was absorbed by the treated leaves and translocated to untreated ones and to the roots and the generative organs. A comparison between a single foliar application to $\frac{1}{3}$ of the leaves and a single soil application, however, showed the latter to be a much more efficient method of P nutrition.

2920. Mors, W. B., and others.
Alkaloids of two Brazilian Apocynaceae: *Rauwolfia grandiflora* Mart. and *Lochnera* (*Vinca*) *rosea* (L.) Reichb. var. *alba* (Sweet) Hubbd.
Chem. Ind. Lond., 1956, No. 11, pp. 173-4, bibl. 15.

The root bark of *Rauwolfia grandiflora* contained 0·08% reserpine. The total plant of *Lochnera rosea* var. *alba* contained 0·036% ajmalicine (with which vinceine and vincain are considered to be identical),

0·02% serpentine and 0·009% of an apparently new alkaloid for which the name lochnerine is proposed.—Inst. Quim. agric., Rio de J., and Wayne Univ., Detroit, Mich.

2921. Ferreyra H., R.
Las *Rauwolfias* en el Peru. (*Rauwolfia* **species in Peru.**)
Inf. Estac. exp. agric. La Molina, 1955, **29**(339): 1-4, bibl. 3, illus.
Five species of *Rauwolfia* have so far been recorded in Peru, including *R. hirsuta*, which is here described in some detail.

2922. Schuler, B. O. G., and Warren, F. L.
***Rauwolfia* alkaloids. Part I. Reserpine and ajmaline from *Rauwolfia natalensis* Sond. (*R. caffra*).**
J. chem. Soc. Lond., 1956, January, pp. 215-16, bibl. 9.
Extraction of the root bark of *Rauwolfia caffra* gave only small quantities of reserpine. The main alkaloid was identified as ajmaline.—Univ. Natal, Pietermaritzburg.

2923. Chandra, V.
Cultivation of *Rauvolfia serpentina* Benth.
Sci. and Cult., 1956, **21**: 601, bibl. 1, illus.
Seeds were sown in pots and in open ground in August. In clay soil 7 to 15% germinated, but none germinated in sand or sandy soil. Observations on established plants indicate that they prefer clay soils and will flourish under mango trees.—Nat. bot. Gdn, Lucknow.

2924. Ruppol, E., and Turkovic, I.
Contribution à l'étude des *Strophanthus*. I. Note sur les glucosides du *Strophanthus arnoldianus*. II. Tableau récapitulatif des hétérosides de divers *Strophanthus*. **(Contribution to the study of *Strophanthus*. I. Note on the glycosides of *S. arnoldianus*. II. Summarizing table of heterosides of different *Strophanthus* spp.)**
J. Pharm. belge, 1954, **9**(3-4): 95-105, from abstr. in *Biol. Abstr., Sect. D*, 1956, **30**, No. 8577.
A new glycoside, called C.B.I., has been prepared from seeds of *S. arnoldianus*; its action is similar to that of ouabain. Another glycoside, C.B.II, has been prepared from leaves of the same species; this has the same properties as cymarin. The characteristics of all known *Strophanthus* glycosides are tabulated in an appendix.—Univ. Louvain.

Essential oils.

(*See also* 2948d, f.)

2925. Ilieva, S., Dimitrova, E., and Zolotovič, G.
The production of essential oil of *Salvia sclarea* L. in Bulgaria. (First report.)
[Russian, with English summary 8 lines.]
C.R. Acad. bulg. Sci., 1955, **8**(1): 49-52, bibl. 7.
Salvia sclarea was successfully grown in field trials in Kasanlik and Samokov. In the second year the plants yielded 4,000–6,000 kg. per acre of racemes. Only the flowers should be used for distillation, because the inclusion of leaves lowers the quality of the oil.

2926. Zolotovič, G., Ilieva, S., and Dimitrova, E.
The production of essential oil of *Salvia sclarea* L. in Bulgaria. (Second report.)
[Russian, with English summary 6 lines.]
C.R. Acad. bulg. Sci., 1955, **8**(1): 53-6, bibl. 2.
Results of studies on oil extraction from *Salvia sclarea* racemes are given. Harvested material should not be stored for more than 2 hours. The flowers may be cut up before distillation. Distillation by steam takes about 60–70 minutes. The percentage of oil in the water is about 0·02%, with a low percentage of linalyl acetate.

2927. McKern, H. H. G., Penfold, A. R., and Simonsen, Sir J. L.
Santal camphor.
Chem. Ind. Lond., 1956, No. 11, pp. 179-80, bibl. 6.
Re-examination of the volatile oil from the wood of the South Australian *Santalum acuminatum* (Quandong, Sweet Quandong, Native Peach) shows that santal camphor, earlier reported to be present, is in fact absent, and suggests that the earlier workers must have examined the oil of *Eremophila mitchelli* (Buddah, Bastard Sandalwood).—Museum appl. Arts. Sci., Sydney, N.S.W.

2928. Coveney, R. D., Matthews, W. S. A., and Pickering, G. B.
The volatile oil of *Strobilanthopsis linifolia* from Northern Rhodesia.
Colon. Plant Anim. Prod., 1955 (issued 1956), **5**: 150-8.
An oil obtained by the steam distillation of leaves, flowers and sticky tips of the branches of *Strobilanthopsis linifolia* was found to consist entirely of sesquiterpenes and their derivatives. None of these has any known medicinal value.

Fibres.

(*See also* 2415k, 2948a, h, 3219.)

2929. Jannaccone, A.
Concimazione fosfo-potassica e competizione delle piante fra loro in *Cannabis sativa* L. **(Phosphorus and potash manuring in relation to competition among hemp plants.)**
Ital. agric., 1956, **93**: 131-5, bibl. 6.
Earlier investigations on hemp manuring in Campania showed that: (1) Heavy NPK applications result in a reduction in number of plants through excessive competition. (2) To minimize possible qualitative or quantitative reductions in yield from this cause the number of seeds sown per sq. m. should be increased above the average of 250. (3) Suppression is increased by N, probably in proportion to the amount applied, the effects of nitrate and ammonium N being similar in this respect. (4) On good hemp soils the N dressing should be reduced from the normal 60 kg./ha. to 45–50 kg. Further experiments were made in the

Caserta district on P and K manuring. The chief results and conclusions were: (1) P and K had no significant effect on the suppression of plants. (2) P and K have no significant effect on yield on fertile soils and should not be used under such conditions. (3) N is essential for good yields but should not be used at rates above 40 kg./ha. on fertile soils.

2930. Tanganyika Sisal Growers' Association (Lock, G. W., and others).
Annual Report of the Sisal Research Station, Mlingano, Ngomeni, for the year 1954, 1955, pp. 52, illus.

A brief outline of research, already published elsewhere [see *H.A.*, 26: 832] is repeated and is followed by more detailed results of experiments. General conclusions drawn include: *Nitrogen:* N hastens growth and leads to improved leaf quality, especially in the presence of Ca or P. Potassium nitrate, however, has resulted in acute withering of leaf tips. Nitrate N appears to be especially suitable for bulbil nurseries. *Calcium and soil acidity:* In the 19-year-old cultivation trial clean weeding plus continuous sisal growing has led to progressive acidification of the soil. This sisal is no longer healthy, deficiency disease symptoms being severe. Nearby in the factorial manurial trial on land, which has likewise never been rested, the sisal is quite good after liming and the application of other fertilizers and fibre yields have been satisfactory. Ca deficiency symptoms and chlorotic mottling are pronounced in unlimed plots in an external trial on acid soil near the coast. *Potassium:* The final results of the banding disease manurial trial are very satisfactory. This disease is due to a deficiency of K and an application of half a ton of potassic fertilizer per hectare over the cycle has increased yields by over 60%. K is also proving beneficial on other soils deficient in this nutrient. *Sisal Waste* is unquestionably an excellent manure and mulch for bulbil nurseries. *Spacing:* On exhausted land fibre yields do not increase with plant densities of 5,000 per ha. or more. *Cutting:* Repeated heavy cutting of well-established sisal has reduced fibre yields by 3 tons per ha. or over 15%. Heavy cutting of very young sisal is having a pronounced adverse effect upon development and leaf size. *Cultivation:* Different systems of land preparation have not had much effect upon growth in a trial in the Kilosa district. *Ridging:* Ridging well-drained red soils has been shown to be unnecessary. An initial fillip it gave to growth proved to be transitory and final yields were not affected.

Hops.

(*See also* 2416d, 2670q, 2948j.)

2931. Talboys, P. W., and Wilson, J. F.
A study of wilt-tolerance in the hop by means of intervarietal graft complexes.
A.R. E. Malling Res. Stat. 1955, 1956, **A39**: 126-30, bibl. 2, illus.

Earlier work on host-parasite relations based on intervarietal grafts [*H.A.*, 23: 4398] was supplemented by studies of approach-grafted and top-grafted combinations of the wilt-sensitive Fuggle and the wilt-tolerant Keyworth's Midseason. The results of inoculations at various sites show that the action of the hop root system in determining the severity of *Verticillium* wilt symptoms does not result from the translocation of specific "resistance" or "sensitivity" factors.

2932. Jeffrey, I. M.
New developments in hop dusting.
Comm. Gr, 1956, No. 3146, p. 603.

Effective control of downy mildew on hops with reduced labour costs was obtained by using a copper oxychloride spray applied by the "drift-dusting" method. The dust, Cuprosana, was composed of an inert carrier of relatively large, but graded, particles with very fine particles of the active ingredient. The machine used was a Whirlwind, and the nozzle was pointed above the crop so that a cloud drifted with the prevailing wind just above crop level. By using this technique 2 men were able to dust 8 acres per hour.

2933. Morrison, H. E., and Thompson, B. G.
Control of hop aphid and two-spotted spider mite in Oregon.
J. econ. Ent., 1955, **48**: 706-10, bibl. 16.

The bionomics and control of the 2 main hop pests in Oregon, *Phorodon humuli* and *Tetranychus telarius*, are reviewed. In tests conducted in 1953 and 1954 both species were controlled by several organic phosphorus insecticides, Demeton gave the best results, and when it was applied at 8 oz. of actual material per acre good control of both pests was maintained for 33 days. The application of demeton to hops through a sprinkler irrigation system has been used successfully and this method of treatment fits readily into established agronomic practices.—Ore. St. Coll., Corvallis.

Insecticidal plants.

(*See also* 3213, 3219.)

2934. Kennard, W. C.
Effect of defoliation on two clones of *Derris elliptica*.
Trop. Agriculture Trin., 1956, **33**: 158-61, bibl. 4, illus.

A 12% spray of Aero Cyanate (91% potassium cyanate) caused complete defoliation of derris within a week and thus facilitated harvesting without damaging the plants or affecting the percentage of rotenone extracted from the roots. 2,4,5-T at 0·02% also caused defoliation but damaged the shoots. 2,4-D at 0·02% only caused about 30% leaf fall.

2935. Moore, J. A., and Eng, S.
Some new constituents of *Piscidia erythrina* L.
J. Amer. chem. Soc., 1956, **78**: 395-8, bibl. 8.

A reinvestigation of the constituents of the leguminous tree *Piscidia erythrina* [Jamaica dogwood] has led to the isolation of piscidic acid, rotenone and five apparently new aromatic substances. The new substances are characterized.

2936. Feuell, A. J.
Pyrethrum trends and prospects.
Colon. Plant Anim. Prod., 1955 (issued 1956), **5**: 128-36, bibl. 13.

The position of pyrethrum is considered in relation to current developments in the synthetic insecticide field. The author concludes that the demand for pyrethrum will continue at a high level for some time to come.

2937. TUCKETT, J. R.
Pyrethrum experiments, 1954.
A.R. Tanganyika Dep. Agric., 1954, Part II, 1955, pp. 105-15.

Fertilizer trials have shown that 300 lb. superphosphate per acre is an economic proposition and that on volcanic ash soils the first 150 lb. is not available to pyrethrum. *Planting date:* Plantings made at different times between December and March yielded a similar weight of flowers over a 3-year period, and there is no disadvantage in late planting up to mid-March unless a quick return in the first season is required. Planting in mid-November, however, yielded 550 lb. per acre more over 3 years than did any other planting date. *Mulching:* Grass mulching between alternate rows of pyrethrum increased yields from 406 to 514 lb. dry flowers per acre. A correlation between mulching and soil moisture was apparent and also between these factors and yield increase. *Root cutting:* Planting splits with roots shortened to 3 in. had no appreciable adverse effect on yield, a result which supports the view that mechanical transplanting would be feasible. *Mechanical picking* with the picker tested did not result in reduced yields. *Seed vs. flowers:* Two 2-year-old trials, designed to find out the best time of year to take seed from pyrethrum and to study the effects of seed production on subsequent flower yield, have so far shown that: (1) Given a market for seed the seed crop greatly exceeds the flower crop in value; (2) higher seed yields are obtained in the second flush than in the first, whereas flower production is good in both flushes; (3) taking seed in both flushes and flowers between flushes does not greatly increase seed yield compared with 2nd flush picking only, but considerably reduces flower production; and (4) flower production was lower in one trial than in the other, seed yields in both were similar. The germination rate of freshly harvested seed varied from 15 to 67%. *Planting technique:* There was no significant difference between the yields following careless planting (63 lb. dry flowers per acre) and careful planting, but the yield from careful planting plus 1 oz. water in the planting hole was significantly greater (127 lb.) than careful planting alone. *Spacing* × *superphosphate:* Superphosphate at both 150 and 300 lb. per acre gave significant increases over no superphosphate. Yields were slightly, but not significantly, higher at 6 in. than at 12 in. spacing.

2938. HOLLY, K.
The effect of various herbicides on pyrethrum.
Pestic. Abstr. News Summ., 1956, **2**: 7-11.

The resistance of pyrethrum to some of the newer herbicides was tested in pot experiments. Twenty-three compounds were sprayed at 2 rates on to pyrethrum plants at the early 3-leaf stage. The most promising compound seemed to be trichloracetic acid (TCA), which caused little damage at rates of 3 or 9 lb./acre. Further experiments indicated that TCA may be sufficiently selective to control germinating grass weeds in pyrethrum. Other compounds tested, on which further tests may be of value, are 2-chloroallyl dithiocarbamate, α-chloro-N,N-diethyl acetamide, α-chloro-N,N-diallyl acetamide, isopropyl-N-(3-chlorophenyl) carbamate, and 2,2,3-trichloropropionic acid. —A.R.C. Unit exp. Agron., Oxford.

2939. FOUCART, G.
La lutte contre *Ramularia bellunensis*, principal ennemi du pyrèthre. (**Control of *Ramularia bellunensis*, chief disease of pyrethrum.**)
Bull. Inf. INEAC, 1956, **5**: 39-48, bibl. 2, illus.

Fortnightly spraying with 50% captan at 0·30% (plus a wetter) at 600 l. per ha. from the time when the plants came into production gave excellent control of bud disease (*Ramularia bellunensis*) in pyrethrum stands spaced at 40 × 60 cm. Production was three times that of the control.—Lab. phytopath. Mulunga. [For earlier work see *H.A.*, 24: 4051.]

2940. ANON.
Insecticide booster from sesame.
Agric. Res. Wash., 1956, **4**(7): 16.

Sesamolin, which occurs in sesame oil, has a synergistic action on pyrethrum, increasing its killing power 30-fold.

Rubber plants.

(*See also* 2948 l, 3191g.)

2941. RYCHNOVSKÁ-SOUDKOVÁ, M.
Podíl insolace na tvorbě gutty v brslenech. (**The effect of light on guttapercha formation in *Euonymus verrucosa*.**) [Russian and German summaries 5 lines each.]
Preslia, 1955, **27**: 407-10, bibl. 5.

The amount of sunlight available to *E. verrucosa* plants growing under various natural conditions had no effect on guttapercha accumulation.

Seed oils.

(*See also* 2948b, i, k, m, r, t, v, 3041n.)

2942. ALABOUVETTE, L., AND RAUTOU, S.
Le ricin dans la région méridionale. (**Castor bean growing in southern France.**)
C.R. Acad. Agric. Fr., 1956, **42**: 159-65.

In a trial of 6 American castor bean varieties in 1954 the best oil yields at a density of 25,000 plants per ha. (50 × 80 cm.) were given by the semi-late Cimarron (802 kg. per ha.) and the late Conner (798), their oil contents being 53·7 and 56·2% respectively. At 31,250/ha. (40 × 80 cm.) the best oil yields were given by Conner (741) and Cimarron (680). In 1955 4 American varieties and 4 American hybrids (from male-sterile mother plants) were tested at 25,000/ha. The highest oil yields were given by the early Cimarron hybrid (947 kg.), the early Hybrid 7 (912) and Conner (883).—Stat. Amél. Plantes, Montpellier.

2943. SCHOENLEBER, L. G.
Huller-cleaners for castor bean harvesters.
Bull. Okla. agric. Exp. Stat. **B-461**, 1955, pp. 10, illus.

A large capacity huller-cleaner has been developed for mounting on to castor bean harvesters capable of harvesting up to 4 rows at a time. The huller-cleaner will hull up to 3 tons of castor seeds per hour. Detailed plans are obtainable from the Oklahoma Agricultural Experiment Station, Stillwater.

2944. HANCOX, N. C., AND HATT, H. H.
A seed fat of *Mallotus philippinensis* (kamala oil)—an examination of some Australian material.
Qd J. agric. Sci., 1955, **12**: 57-60, bibl. 8.
Australian samples of seeds of *Mallotus philippinensis*, a tree which has recently received much attention in India as a source of a seed oil possessing drying properties very similar to those of tung oil, have been examined. The Australian oil is shown to be comparable with the Indian. Obstacles to economic production are harvesting difficulties, smallness of the fruit, variability in the quality of the oil, and the need to use solvents other than the usual light petroleum for extraction. [Authors' summary.]—Div. indust. Chem., C.S.I.R.O.

2945. FAIRCHILD, P. L. K., RAYMOND, W. D., AND SPICKETT, R. G. W.
***Ricinodendron viticoides* nuts from Tanganyika.**
Colon. Plant Anim. Prod., 1955 (issued 1956), **5**: 158-62.
Oil extracted from *Ricinodendron viticoides* kernels contained less α-elaeostearic acid and more linoleic acid than that from *R. africanum* nuts. No linolenic acid was found. The oil is of no commercial value, both because of its composition and the low percentage of kernel (15%).

2946. THOMAS, C. A.
The effect of rust on yield and oil content of safflower.
From abstr. in *Phytopathology*, 1956, **46**: 29.
Two near-isogenic varieties, one rust-susceptible (N8) and the other resistant (W14), were compared in isolated plots at Beltsville, Maryland, *Puccinia carthami* being introduced into some plots and not into others. Results from tests in 2 years showed that rusted N8 yielded 65% as much as W14, whereas rust-free N8 yielded 95% as much as W14. Oil contents of N8 seed from rust plots averaged 3·7% higher than that of seed from rust-free plots. Oil content of W14 seed from all plots was close to that of N8 grown rust free. Rust appeared to predispose plants to firing, to reduce amount of hull on seed, and to lower bushel weight.

Tannin plants.

2947. PEARMAN, R. W.
Tanning materials of the British Commonwealth.
Colon. Plant Anim. Prod., 1955 (issued 1956), **5**: 96-118, bibl. 18.
Mangroves are widely distributed in the tropical regions of the British Commonwealth. Tannin is contained in all parts of mangrove trees, but only the bark contains sufficient for commercial recovery. Bark for export should contain at least 37% of tannin, otherwise a preliminary extraction must be carried out. Mangrove species are listed for the various countries.

2948. ***Noted.***

a DE ALMEIDA, L. L.
Aspectos geográficos do Nordeste e a economia agavieira da Paraíba. **(Geographical notes on the Northeast [of Brazil] and the economics of agave growing in Paraiba.)**
Rev. Ceres, 1955, **9**: 304-21.

b BEEVERS, H., AND WALKER, D. A.
The oxidative activity of particulate fractions from germinating castor beans.
Biochem. J., 1956, **62**: 114-20, bibl. 15.

c BEVAN, C. W. L., BROADBENT, J. L., AND HIRST, J.
A convulsant alkaloid of *Dioscorea dumetorum*.
Nature, 1956, **177**: 935, bibl. 3.
Dioscorine.

d BROWICZ, K.
Korkowiec amurski (*Phellodendron amurense* Rupr.) i jego znaczenie gospodarcze. **(The Amur cork-tree (*Phellodendron amurense* Rupr.) and its economic importance.)** [English and Russian summaries ¾ p. each.]
Ann. Sect. dendrol. Soc. bot. Pologne, 1955, **10**: 305-23, bibl. 20, illus.
Products include cork, essential oil, pigments and tannins.

e EVANS, W. C.
The structure of the root, rootstock and stem-base of *Rauwolfia vomitoria* Afz.
J. Pharm., Lond., 1956, **8**: 120-33, from abstr. in *Trop. Abstr.*, 1956, **11**, No. d.539.

f FILIPEK, Z.
Badania wstępne nad składem chemicznym owoców korkowca amurskiego (*Phellodendron amurense* Rupr.). **(The chemical composition of the fruits of the Amur cork tree (*Phellodendron amurense* Rupr.).)** [English and Russian summaries 13 and 14 lines.]
Ann. Sect. dendrol. Soc. bot. Pologne, 1955, **10**: 401-4, bibl. 4.
The fruits contained 6% essential oil.

g GILLOT, J.
En faveur du développement de la culture du poivrier au Congo belge. **(Black pepper as a suitable crop for the Belgian Congo.)** [Flemish summary 1½ pp.]
Bull. agric. Congo belge, 1956, **47**: 1-29, bibl. 26, illus.
Ecological requirements, propagation, culture, processing, diseases and pests.

h GOIDÀNICH, G.
Malattie crittogamiche della canapa. **(Fungal diseases of hemp.)**
[*Publ.*] *Ist. Pat. veg. Bologna*, [1955?], pp. 21, illus.
Symptoms of pathogenic and climatic disorders of *Cannabis sativa*.

i HATT, H. H., AND SCHOENFELD, R.
Some seed fats of the Santalaceae family.
J. Sci. Food Agric., 1956, **7**: 130-3, bibl. 9.
In *Santalum acuminatum*, *S. murrayanum* and *S. spicatum* in Australia.

j HOWARD, G. A.
New approach to the analysis of hop oil.
J. Inst. Brew., 1956, **62**: 158-9, bibl. 8.
By gas-liquid partition chromatography.

k J., R.M., AND F., P.L.K.
Castor seed from Northern Rhodesia.
Colon. Plant Anim. Prod., 1955 (issued 1956), **5**: 165-6.
Composition and commercial value.

l KOTER, M., AND KRÓLIKOWSKI, L.
Potrzeby pokarmowe mniszka gumodajnego (*Taraxacum Kok-saghiz*). **(Nutrient requirements of *Taraxacum kok-saghyz*.)**
Roczn. Nauk rol., Ser. A, 1954, **70**: 135-9, bibl. 5.
Plants showed more response to N and P than to K.

m KRISHNAMURTHI, M. N.
Literature review on oils and fats, 1953.
[*Publ.*] *Coun. sci. industr. Res., India*, 1955, pp. 42, bibl. numerous in text.
Including brief notes on culture, etc., of many oil seed crops.

n KURUP, P. A.
Antibiotic principle of the leaves of *Withania somnifera*.
Curr. Sci., 1956, **25**: 57-8, bibl. 1, diagram.
Against bacteria.

o MACKIE, A., AND MISRA, A. L.
Chemical investigation of the leaves of *Anona senegalensis*. I.—Constituents of the leaf wax.
J. Sci. Food Agric., 1956, **7**: 203-9, bibl. 18.
Both hard and soft waxes, the latter with insecticidal properties.

p MEI, A.
Su alcuni problemi riguardanti la moderna coltura del pepe. **(Some problems connected with modern black pepper culture.)** [English summary 6 lines.]
Riv. Agric. subtrop., 1956, **50**: 92-112, bibl. 2, illus.
A review covering species, varieties, propagation, supports and shading.

q MOJA, A., AND BENZONI, F.
Identificazione precoce dei caratteri genofenotipici in *Cichorium intybus* L. **(Early identification of the genetic and phenotypic characters in *Cichorium intybus*.)** [English summary 8 lines.]
Ann. Sper. agrar., 1956, **10**: 455-69, bibl. 7, illus.
Central cylinder/bark ratio.

r PATHAK, S. P., AND DEY, L. M.
The component acids and glycerides of *Erythrina indica* seed fat.
J. Sci. Food Agric., 1956, **7**: 200-3, bibl. 4.
Investigated at Banaras Hindu University.

s S., R.G., AND W., J.B.
Kola nut pods (*Cola* spp.) from Nigeria.
Colon. Plant Anim. Prod., 1955 (issued 1956), **5**: 166-7.
Analysis of pods.

t SARKAR, S., AND CHAKRABARTY, M. M.
Seed fats of the Euphorbiaceae family. Part I—The chemical examination of the seed fat from *Trewia nudiflora*.
Sci. and Cult., 1956, **21**: 473-4, bibl. 3.
Oil similar to tung oil.

u SPENSLEY, P. C.
A source of hecogenin. Part III. Further observations on its extraction from sisal juice.
Chem. Ind. Lond., 1956, No. 14, pp. 229-31, bibl. 10.
See also *H.A.*, 22: 2825 and *H.A.*, 23: 2040.

v SPOON, W., SESSELER, W. M., AND SPRUIT, D.
Kan boegroemakka-vet de cacao-boter vervangen? **(Can boegroemakka or murumuru fat be used as substitute for cocoa butter?)** [English summary 1 p.]
Cacao, Choc. Suikerw., 1955, **23**: 422 et seq., reprinted as *Ber. Afd. trop. Prod. kon. Inst. Tropen.* **253**, 1955, pp. 13, bibl. 5.
Fat from *Astrocaryum sciophilum* kernels proved unsatisfactory.

w TYLER, V. E., JR.
The effect of germination on the alkaloid content of *Nigella damascena* seed.
J. Amer. Pharm. Ass., sci. Ed., 1955, **44**(1): 52-4, illus., from abstr. in *Biol. Abstr., Sect. D*, 1956, **30**, No. 2657.

FLORICULTURE.

General.

(*See also* 2380, 2397, 2408, 2415a, 2422, 3041 l, m, 3042b, j, q.)

2949. CHAN, A. P., AND MACARTHUR, M.
Floriculture research.
Progr. Rep. hort. Div., centr. exp. Fm, Ottawa, 1949-53, pp. 108-19, illus.
Greenhouse roses: Gravel culture was the most efficient of several watering methods studied, but it required high initial investment, and stem length of the roses averaged 1–3 inches less; gradual knife pruning gave better production than cutting back after drying off. *Carnations:* Controlling the timing of peak flowering periods has not yet been possible owing to the large number of influencing factors; K deficiency resulted in bleaching of the leaf tips, and N deficiency in stunted growth, and stiff, narrow strap-like leaves. *Poinsettias:* In a precision-method study vigorous cuttings were obtained from stock plants grown in large containers, propagation was best done from July 16 to September 1, the best period for panning was September 15 to October 1, and frequent fertilization (particularly with N and K) was necessary for both stock and young plants. *Chrysanthemums:* Nutrient levels did not affect the time of flowering; flower initiation occurred more readily in older plants, and in plants with a hard type of growth produced by starvation

levels of nutrients [see also *H.A.*, 26: 892]. *Tulips:* In experiments with William Pitt it was shown that warm storage after early digging did not fully compensate for disturbed development; early forcing required 29–30 weeks from leaf formation in the bud; pre-treatment with cool storage before carpel formation, and root drying both resulted in a high percentage of paper flowers and an extended cutting period; flower degeneration to paper bloom occurs late in plant development.

2950. Aalsmeer.
Jaarverslag van het proefstation voor de bloemisterij te Aalsmeer over 1954. **(Annual report of the Research Station for Floriculture, Aalsmeer, for 1954)**, pp. 141.

Investigations, additional to those reported below in separate abstracts included: *Aster:* Wilt. *Chrysanthemum:* Variety trials. *Dahlia:* Variety trial and short day treatment for tubers. *Forsythia:* Flower forcing and retarding. *Gerbera:* Foot rot. *Gesneria:* Short-day treatment. *Kalanchoë:* Humidity effect on forcing. *Antirrhinum:* Winter culture of heterosis types. *Rose:* Variety and rootstock trials; mildew and red spider control. *Asparagus plumosus:* Gravel culture and root rot. *Viola:* Weed control. *Stocks:* Variety trial. *General:* Compost trials, methods of improving the keeping qualities of cut flowers, weed control in flower crops, the use of plastics and soil and water experiments.

2951. Mameli Calvino, G. E.
Relazione dell'attività svolta dalla Stazione Sperimentale di Floricoltura nell'anno 1954. **(Annual Report of the Floricultural Experiment Station [at San Remo] for 1954.)** [English summary 8 lines.]
Ann. Sper. agrar., 1956, Vol. **10**, No. 2, Suppl. pp. lvii–lxxxviii, illus.

An account is given of work done at the Orazio Raimondo Floricultural Experiment Station in 1954, which included breeding and selection of carnations, roses, freezias, gladiolus, nerines, tulips, *Strelitzia reginae* and crotons; rose rootstock trials; and investigations on insecticides, fungicides, sprinkler irrigation, foliar nutrition and the relationship between flowering inhibition and the production of storage organs in gladiolus.

2952. Thayer, C. L., and others.
Department of floriculture.
A.R. Mass. agric. Exp. Stat. 1953–1954, pp. 61-6.

Work is reported on the following: *Carnations:* After days of high sunlight, production of 3 varieties was increased by transferring the plants to 60° F., and in White Sim and Sidney Littlefield this also reduced splitting and increased weight and stem length. The life of cut flowers was prolonged by 75–100% when commercial preservatives were added to the water; flower life was limited to approximately 1 additional day whenever transpiration exceeded absorption. Rooted carnation cuttings were stored in polyethylene film for up to 6 months, and unrooted cuttings were stored for up to 4 months. *Roses:* Additional K applications resulted in no significant differences in flower yields with Better Times; Aerotil and Krilium 631 have had no effect on structure of glasshouse soils; NaFeEDTA applied at rates of 2–24 oz./100 sq. ft. and Na_3EDTA applied without iron at 14–12 oz./100 sq. ft. were equally effective in correcting Fe chlorosis in 3–7 weeks, but foliar sprays of iron chelate at 2 lb./100 gal. were seriously phytotoxic. *Snapdragons:* Plants receiving a 16-hour day flowered 17 days earlier than those in normal day-lengths; increased light intensity also reduced the time taken to flower; plants were most sensitive to increased day-length when 8 leaves had developed. Preliminary tests indicated that liquid feed of nitrate immediately after benching and a delay of up to 5 weeks before liquid feeding of nitrates had no significant effect on either quality or number of days to first flower. *Eucharis-lily:* In bulbs stored at 36–38° F. for 7 days bulb reproduction was stimulated and vegetative growth retarded; bulb defoliation before temperature treatment or replanting did not affect subsequent growth or flowering; July replanting gave a better crop of winter flowers than an early August replanting; and larger bulbs (2½–3 in.) produced more offsets and flowered more readily than smaller bulbs. *Gardenias:* Iron chelates as soil or foliage applications corrected Fe chlorosis.

2953. McClure, E. B.
Fiber glass greenhouse.
Brooklyn bot. Gdn Rec., 1955-56, **11**: 247-9, illus.

Panels of fibre glass plastic have been used to construct greenhouses for orchids and other plants. Plant growth appears to be better under the bright but diffuse light than in a conventional glasshouse. More watering than in the old house and almost constant air circulation are necessary.

2954. Widmoyer, F. B., and Watson, D. P.
Use of a polyethylene greenhouse for rooting softwood cuttings.
Quart. Bull. Mich. agric. Exp. Stat., 1956, **38**: 350-2, illus.

An aluminium-framed, portable greenhouse covered with 0·006 gauge polyethylene was tested for rooting cuttings in the spring. The addition of constant mist during daylight moderated the temperature. Softwood cuttings in vermiculite callused and rooted normally in this house.

2955. (Ball, V.)
Mist germination.
Flor. Exch., 1956, **126**(9): 14.

Seeds of antirrhinums, petunias, pansies, begonias and marigolds sown under mist germinated faster and better than under hand watering. The boxes were filled with a peat-soil mixture topped with an inch layer of finely-shredded loamy peat. The boxes were removed from the mist after the seed leaves had opened out.

2956. Dickey, R. D.
Freezing injury studies with foliage plants.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 343-5.

Plants used in shipping tests were *Philodendron cordatum*, *Pothos*, variegated *Peperomia* and *Nephthytis liberica*. The maximum cold protection, from temperatures of about 0° F., was provided by packing the plants in a double-walled box with cut paper between

the walls, and by insulating this box with jiffy blanket (a cellulose insulating material) or newspaper, individual plants or bundles of plants being wrapped in a cylinder of newspaper which entirely covered them.—Fla agric. Exp. Stat., Gainesville.

2957. Hennebo, D.
Betrachtungen zur altägyptischen Gartenkunst. (**Observations on garden design in ancient Egypt.**)
Arch. Gartenb., 1955, **3**: 175-218, bibl. 97, illus.
A well illustrated, almost overdocumented, account is given of the very formal garden architecture of ancient Egypt.

2958. Balls, W. L.
Seven garden seasons.
Weather, 1956, **11**: 71-3, bibl. 1.
First flowering dates are recorded for 25 perennial species (shrubs, bulbs and herbaceous plants) in a Cambridgeshire garden over a period of 7 years. A few suggestions are made concerning the factors which may determine time of flowering.

2959. de Groote, R.
L'utilisation du compost de ville en horticulture. (**The use of town compost in horticulture.**) [English and German summaries 4 and 6 lines respectively.]
Rev. Agric. Brux., 1956, **9**: 165-71, illus.
Several flower and vegetable crops were manured with compost prepared from town waste. Corm yields from begonia and gloxinia were increased by the incorporation of town compost in the soil. Tests with *Azalea indica* were not satisfactory, and the compost was not suitable for hydrangeas. Excellent results were obtained with cinerarea, calceolaria, chrysanthemum, pelargonium, lettuce and melon. Root development of *Ficus*, *Sanseveria* and *Philodendron* was improved by the addition of compost. The strawberry variety "Princesse Clementine" responded to town compost by earlier maturity, increased yields, more uniform fruit size, increased resistance to diseases, cold and drought, and increased sugar content in the fruits.

2960. Leyden, R. F., and Toth, S. J.
Find agricultural use for waste cellophane.
N.J. Agric., 1955, **37**(6): 9-11, illus.
Waste cellophane flakes approximately ¼ inch square impregnated with fertilizer to yield a 3–3–3 or 6–6–6 fertilizer showed promise in a recent 2-year test on calendulas, the nutrient elements being as available as those in standard fertilizers and being leached less rapidly. In tests on zinnias waste fertilizer was a good ingredient of potting soil. Combined with moderate watering flakes also show promise as a greenhouse mulch.

2961. Antipov, V. G.
Resistance of perennials to gases. [Russian.]
Sad i Ogorod, 1956, No. 1, p. 74.
Among 20 perennials, planted in Leningrad near a chemical factory which once or twice a month releases fumes of hydrochloric acid, only *Funkia* [*Hosta*] *lancifolia*, garden lupins, delphiniums, golden rod and pinks were not affected.

2962. Schread, J. C.
Aphids and scale insects on ornamentals.
Bull. Conn. agric. Exp. Stat. **588**, 1955, pp. 22, bibl. 9, illus.
Control experiments on the following pests are reported: *Aphis pomi*, *Anuraphis roseus*, *Rhopalosiphum prunifoliae* and *Amphorophora crataegi* on hawthorn; *Aphis fabae* and *Anuraphis viburnicola* on viburnum; *Pineus strobi* on pine; *Myzus persicae* on snapdragon; *Glossyparia spuria* on elm; *Diaspis carueli* on juniper; *Aspidiotus* sp. on hemlock; and *Coccus hesperidum* on ivy, camellia and avocado.

2963. Müller, H. W. K.
Die Cyclamenmilbe und andere Weichhautmilben—ihre Bekämpfung. (**Control of the cyclamen and other mites.**)
Gartenwelt, 1956, **56**: 119-21, illus.
Excellent control of *Tarsonemus pallidus* was achieved on strawberries, cyclamens, gloxinias, saintpaulias and other ornamentals by two applications, one week apart, of the endrin preparation Largan at a concentration of 0·1%. Parathion proved inferior.—Staatsinst. angew. Bot., PflSchAmt Hamburg.

2964. Schmitt, R. J.
Hedera. Bestrijding cyclamenmijt. (**Ivy: cyclamen mite control.**)
Jversl. Proefst. Bloem. Aalsmeer 1954, pp. 80-1.
Good control of cyclamen mite (*Tarsonemus pallidus*) on ivy was obtained by 0·2% sprays of 15% parathion emulsion applied 3 or 4 times at intervals of 7–10 days. The temperature after spraying should not fall below 65° F.

2965. Akesson, N. B., and Sciaroni, R. H.
New air powered hand duster.
Calif. Agric., 1956, **10**(3): 3-4, 16, illus.
A compressed air, hand duster is described which has been used successfully on glasshouse carnations and roses. A 7,000 sq. ft. glasshouse has been fumigated in 20 minutes. Air discharge and velocity can be varied according to dust particle size. Clay is the commonest diluent; the concentration of the pesticide also affects its fluidity.

2966. Hall, E. G.
The storage of cut flowers.
Food Pres. Quart., 1956, **16**: 2-5, bibl. 7.
Research, chiefly carried out in America, on prolonging the life of cut flowers by dry storage is summarized. In New South Wales experiments have shown that roses and carnations dry packed in a polyethylene film kept much better at 32° F. than when stored exposed with their stems in water; results were not so good at 41° F. There was no apparent advantage in precooling the flowers before packing to reduce condensation.

Annual and herbaceous plants.

(*See also* 2349, 2354, 2372, 2410, 2865r, 3041d, j, p, u, 3042h, n, r.)

2967. Reese, G.
Agathaea coelestis—colchicininduzierte Polyploide als anbauwürdige Zierpflanzen? (*Agathaea coelestis*—**a colchicine-induced polyploid of value as an ornamental?**)
Züchter, 1956, **26**: 88-91, bibl. 4, illus.

Tetraploid and octoploid forms of *Agathaea coelestis* were induced by colchicine treatment of the plumule, but only the tetraploids survived. The diameter of the tetraploid flower was 25% larger than that of the diploid flower.—Bot. Inst., Univ. Kiel.

2968. Weber, F.
Sortimentüberprüfung bei Astern und Tagetes. **(Variety trials with summer asters and marigolds.)** [English, French and Spanish summaries 4 lines each.]
Mitt. Klosterneuburg Ser. B, 1956, **6**: 11-15.
At the horticultural experiment station at Schonbrünn an attempt is being made to clarify the position as regards the nomenclature of asters (*Callistephus chinensis*) and marigolds (*Tagetes* spp.). Lists of varieties suitable for cutting and of dwarf varieties are given.

2969. Belgraver, W., and others.
Amerikaanse anjers. **(Perpetual flowering carnations.)**
Jversl. Proefst. Bloem. Aalsmeer 1954, pp. 16-32.
Lower yields of William Sim and Crowley's Sim were obtained with later season cuttings. Preliminary trials with illumination resulted in reduced quality, but with Maine Sunshine artificial light produced higher yields. Spray irrigation installations are recommended, and yields were adversely affected by allowing the soil to dry out too much. Plant development of rooted cuttings was best at pH 7·5. In sand culture flower quality of William Sim was better than that of Orchid Beauty and Maine Sunshine. No great differences in quality in gravel culture were observed, but in relatively fine gravel more flowers were produced per plant. *Phialophora cinerescens* and *Phytomonas caryophylli* both spread in gravel culture. Fresh sand is recommended for cuttings; Superol and TMTD were the best of the materials tested for disinfecting cuttings. Illumination of cuttings was favourable under certain conditions. *Phialophora* and *Phytomonas* could be spread by infected water. Soil sterilization with Aardisan or tar oil was not effective against *Fusarium oxysporum* or *Phialophora*. There was an indication that heat therapy at 36–37° C. might control virus diseases.

2970. Rawson, J. M.
Soil factors affecting the growth of carnations.
Diss. Abstr., 1956, **16**: 6, being *Publ.* 14291 of 112 pp.
Northland carnations from 2 sources were grown on 3 Michigan soils and under 3 methods of watering. Total yields were generally similar, but quality was affected by treatment. Flower quality was higher from clay loam soil than from sandy loam soil. Juno and Achilles carnations were grown in 2 clay loam soils in tiles cut to give 5 different depths of soil above a water table. With only 4 inches of soil above the water table plant growth was retarded in both soils. Growth was similar in the soil with the most stable aggregation and best aeration when soil columns 5 to 8 inches deep were used. In the other soil growth improved steadily as soil depth increased.

2971. Shurtleff, M. C., and Sherwood, C. H.
A simplified method for culturing carnation cuttings for *Fusarium* wilt.
From abstr. in *Phytopathology*, 1956, **46**: 26.
A description is given of a simple technique for use by growers for screening their own cuttings against *Fusarium* wilt (*F. oxysporum* f. *dianthi*).

2972. Widmer, R. E.
The determination of cold resistance in the garden chrysanthemum and its relation to winter survival.
Diss. Abstr., 1955, **15**: 2380, being *Publ.* 14547 of 120 pp.
A satisfactory indication of cold resistance of chrysanthemum plants was obtained by placing the plants at 6° C., then lowering the temperature by 3° C. each week until a minimum of −21° C. or below was reached, followed by 1 week of post-exposure conditioning at 2° C. Results were less good from a test in which the plants were hardened for 3 weeks at 2° C. and then exposed for 1–7 days to sub-freezing temperatures followed by one week of post-exposure conditioning at 2° C. In general a limited amount of injury occurred when plants were exposed to −9° C., while injury was severe when plants were exposed to −15° C. for 1 week. The variety Boreas was significantly less cold resistant than Duluth and Dr. Longley; the latter varieties did not show any consistent differences in cold resistance during 4 years of testing. The Minnesota selections 49–197–12 and 51–119–52 tended to be more cold resistant than Dr. Longley, but the difference was not significant. Selection 51–119–46 was significantly more cold resistant than Dr. Longley. Other factors found to affect winter survival were soil moisture content, length of natural hardening period, length of low temperature exposure and amount of premature foliage loss.

2973. Cathey, H. M.
A study of the effects of light and temperature upon the flowering of *Chrysanthemum morifolium* and *Tulipa gesneriana*.
Diss. Abstr., 1955, **15**: 2375-6, being *Publ.* 15004 of 252 pp.
The minimum time required for flowering of *Chrysanthemum morifolium* was obtained with growth at 60° F. Varieties were classified into 3 types according to temperature response, viz. thermozero, thermopositive and thermonegative [see *H.A.*, 24: 4089]. The time required for flower initiation was reduced at high night temperatures. Temperature modified the critical photoperiod required for both flower initiation and development. There was a straight line relationship between temperature and flower initiation. At low temperature the photoperiod required for flower development was slightly less than that required for flower initiation. When the apical region was held at 80° F. while the leaves were at a minimum night temperature of 50° F., flowering occurred at the same time as in plants grown with all their organs at 80° F. By lowering the temperature the rate of bud initiation was delayed basipetally down the stem. Spray formation was altered by low temperatures. The rate of flower development was affected by temperature changes from 80° F. to 50° or 60° F.; after initiation

low temperature (50° F.) greatly accelerated flower bud development. Day temperatures partially overcame the effects of short periods of low temperature during the dark period, but could not counteract the effect of low temperature during the entire dark period. Flowering of Encore was delayed by growing cuttings at temperatures below 60° F. and was further delayed by reduced light intensity and by storage of the cuttings at 31° F. Delayed flowering was nullified by treatment at 45° C. for 5 minutes. Delayed flowering was associated with increased respiration (measured at 25° C.), reduced soluble nitrogenous compounds and carbohydrates, and decreased total titratable organic acids, but these returned to normal rates and contents after brief heat treatment. The "dormant" bulb of *Tulipa gesneriana* contained one predominant nitrogenous compound, arginine. During flower development arginine decreased and glutamine, alanine, γ-amino butyric acid, proline, and asparagine increased.

2974. Williamson, C. E., and others.
Some tests with soil fumigants.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 370-3.

Vapam, Crag 974, Dowfume MC-2 (methyl bromide) and F.A.D. (a mixture of formalin, allyl alcohol and Shell D-D) were used in soil fumigation tests for chrysanthemums. Pre-planting weed control was excellent with Dowfume, and satisfactory with Vapam and Crag 974. All treatments applied after planting gave significant weed control. All treatments resulted in a highly significant increase in green weight of chrysanthemums. Dowfume gave very highly significant nematode control in comparison with other treatments and the control. Some varietal resistance to Southern root-knot nematode (*Meloidogyne incognita*) was apparent. No conclusions were reached regarding the effectiveness of the treatments for disease control.

2975. Viennot-Bourgin, G.
Centrospora acerina (Hart.) Newhall, parasite des cultures de pensée. (***Centrospora acerina*, a parasite of pansy crops.**)
Ann. Épiphyt., 1955, **6**: 433-56, bibl. 21, illus.

The symptoms of a pansy leaf and flower spot disease due to *Centrospora acerina* and the biology of the pathogen are described. Control can be obtained by drenching the soil of infected beds at least 10 days before sowing with 4 g. formalin in 2 l. water per sq. m., followed, if necessary, by spraying the plants during growth with 0·25% micronized copper oxychloride in white oil.

2976. Łebkowski, J.
Potrzeby nawozowe *Pelargonium zonale* i *Petunia hybrida grandiflora*. (**Fertilizer requirements of *Pelargonium zonale* and *Petunia hybrida grandiflora*.**)
Roczn. Nauk rol., Ser. A, 1954, **70**: 139-41.

With petunia applications of NPK and with pelargonium those of NPKCa resulted in the best flower production.

2977. Dayton, T. O.
The inheritance of flower colour pigments. I. The genus *Antirrhinum*.
J. Genet., 1956, **54**: 249-60, bibl. 19.

The pigments of varieties, hybrids and 7 species of *Antirrhinum* have been studied by paper chromatography. A tentative scheme of pigment synthesis is outlined, which is based on the assumption that the genes affect precursors of the pigments rather than the pigments themselves and that the final products are the result of interaction and competition between these precursors. [From author's summary.]—John Innes hort. Instn.

2978. Isaac, I.
Some soil factors affecting *Verticillium* wilt of antirrhinum.
Ann. appl. Biol., 1956, **44**: 105-12, bibl. 41.

In pot cultures the incidence of antirrhinum wilt induced by *Verticillium dahliae* and *V. nigrescens* was reduced by increasing sulphate of potash or ammonium sulphate, or by decreasing soil moisture. Very wet soil and heavy dressings of hoof-and-horn were the only conditions under which *V. nubilum* and *V. tricorpus* induced wilt symptoms. *V. albo-atrum* was the most virulent species tested; none of the soil treatments decreased its pathogenicity. Variations in the application rates of chalk and superphosphate and the omission of all the fertilizers had no visible effect on the incidence of wilt caused by any of the 5 *Verticillium* species. [From author's summary.]—Univ. Coll., Swansea.

2979. Kristoffersen, T.
Forsøk med kunstig lys til sommerlevkøy. (**Trials with artificial light for stocks.**)
Gartneryrket, 1955, **45**: 727-34, illus.

Five years' experiments have led to the conclusion that the use of artificial light for raising stocks is economically sound. The data presented show that best results were achieved by continual illumination from germination to planting out of plants sown in December. Of the various types of light and intensities tested fluorescent strip lighting at 150 watts per sq. m. proved to be the most profitable. Light treatment improved plant quality generally and in addition considerably increased the percentage of double flowers.

2980. Kristoffersen, T.
Forsøk med kunstig lys til blomsterert. (**Trials with artificial light for sweet peas.**)
Gartneryrket, 1955, **45**: 759-66, illus.

In 3 years' trials white strip lighting at 150 watts per sq. m. was applied to 4 sweet pea varieties for the period from germination to planting out. Two dates of sowing (second half of November and second half of December) were compared. The results, which are tabulated in detail, show that artificial lighting resulted in much increased profits from plants sown at the earlier date, especially in the case of the variety Julelathyrus.

2981. Chandler, C.
Induced polyploidy in horticultural varieties of *Verbena*.
Contr. Boyce Thompson Inst., 1956, **18**: 243-52, bibl. 20, illus.

Tetraploidy was induced in cultivars of *Verbena hybrida* by colchicine treatment of seeds or growing points. Triploids were obtained by crossing tetraploids with diploids. All polyploids failed to produce seed after controlled hand-pollination in the greenhouse. All diploid plants were highly self-fertile. Five polyploid clones have been selected for introduction to the horticultural trade.

2982. VAN DER MERWE, W. J.
On protoplasmic changes during the aging of cells.
Portug. Acta biol., 1955, **4**: 215-39, bibl. 24, illus.

An account is given of studies on artificial ageing in the corolla and natural ageing in the vegetative leaves of *Zinnia elegans* and the literature on protoplasmic ageing is also briefly reviewed.—Univ. Pretoria.

Bulbs, tubers, etc.

(*See also* 2348, 2368, 2387, 2405, 2407, 2408, 2410, 2739, 3041e, g, i, s, 3042e, f, 3206.)

2983. SAKANISHI, Y.
Effects of various treatments during the summer months on growth and flower production of common calla (*Zantedeschia aethiopica* var. *minor*). [In English.]
J. hort. Ass. Japan, 1955, **24**: 211-16, bibl. 1.

Bulb storage and cultural experiments were made on callas [arums] in 1952/54. The results were: (1) In rhizomes dug in the summer and planted immediately, growth and cut flower production were better under irrigation-shade treatment than under irrigation-no shade, no irrigation-shade and no irrigation-no shade. (2) When rhizomes were dug in the summer and stored before planting, storage at about 10° C. in dry conditions was better than cool, moist storage or common storage. (3) Night temperatures below 5° C. in winter checked growth and flower production. (4) Reducing and non-reducing sugars increased during storage, especially cool storage. (5) Starch decreased under all storage conditions, especially in cool, moist storage, under which conditions sprouting also occurred.—Univ. Osaka.

2984. WASSCHER, J., AND SCHOLTEN, G.
Begonia. [In Dutch.]
Jversl. Proefst. Bloem. Aalsmeer 1954, pp. 36-40.

In trials with large-flowered begonias (Rood and Wit) corm size was markedly increased by a short-day treatment of 3–4 weeks, starting in the second half of July or at the beginning of August. Flower removal also had some effect in increasing corm size. Lorraine begonias under short-day treatment showed less branching, smaller leaves and fewer flower buds than the control plants. "Witex", an emulsifiable material containing polysulphides, gave adequate control of mildew (*Oidium begoniae*), when applied to flowering plants in winter.

2985. KRISTOFFERSEN, T.
Forsøk med kunstig lys til mørplanter og stiklinger av juleglede. **(Trials with artificial light for mother plants and cuttings of begonia.)**
Gartneryrket, 1955, **45**: 791-809, bibl. 9, illus.

The chief results from studies on the light responses of begonias may be summarized as follows: *Mother plants.* (1) Fluorescent light proved a better source of light than incandescent lamps plus fluorescent light, incandescent lamps used alone or high pressure mercury vapour lamps. (2) Close spacing of good plants was more profitable than wider spacing of inferior plants. Artificial light is recommended for 24 hours of the day. (3) The economically optimal amount of light varies with the variety, the price of current and the market value of the plants. In the trials from 25 to 150 watts per sq. m. were used. (4) The length of the period of artificial illumination is determined by natural light conditions; in the experiments it extended from the beginning of November to the end of February. (5) The trials have not clearly shown what temperatures are best at different times, but plants kept at 19–20° C. did not always produce more leaves than plants kept at 16–17° C. (6) The plants should be cut back and the old leaves removed when the light is switched on. *Leaf Cuttings.* (1) Rooting and breaking into growth were little affected by the type of light used, but incandescent lamps were the cheapest source. If rapid growth is desired, fluorescent light is preferable. (2) The day length in the propagation bed proved of greater importance than the day length to which the mother plant was exposed. (3) Cuttings taken in February gave better results than cuttings taken in March. (4) The temperature to which the mother plant was exposed appeared to have an influence on the growth of the cuttings.

2986. SCHMITT, R. J., WEZENBERG, H. J., AND SCHOLTEN, G.
Cyclamen. [In Dutch.]
Jversl. Proefst. Bloem. Aalsmeer 1954, pp. 42-56.

In tests with potting composts, a V.A.M. mixture (1 part town waste to 3 parts soil) gave the poorest results, while the best results were obtained with clay grass sods; krilium had little effect. Manurial studies with Rose van Aalsmeer showed that farmyard manure had a beneficial effect on growth and development; P_2O_5 improved flower number and quality, and leaf number, but N and K_2O applications had little effect. No satisfactory control material for cyclamen mite has been found. Pyralid caterpillars were controlled by BHC. Root rot caused by *Cylindrocarpon radicicola* was controlled by captan and TMTD. Preliminary results showed that damping off (*Pythium* spp.) may be controlled by Ceresan sprays.

2987. JANK, H.
Die Keimung frisch geernteten Cyclamen-Saatgutes und die Möglichkeit der "Sofortaussaat" für züchterische Zwecke. **(The germination of freshly-harvested cyclamen seed and the possibility of immediate sowing as a cultural practice.)**
Dtsch. Gartenb., 1956, **3**: 77-9.

Seed of the cyclamen variety Dunkellachs, which had been stored from harvest until mid-June, showed germination percentages ranging between 75 and 90%. Non-stored seed was also sown and germination varied between 50 and 100%. In a second series of experiments the age of seed at sowing ranged from 0 to 178 days. The average percentage germination was 67·8%,

the highest resulting from late April sowing and the lowest from mid-March. Old seeds germinated more rapidly than new.—Inst. Zierpfl., Humboldt-Univ., Berlin.

2988. ROHLOFF, I.
Untersuchungen über die Keimung der Samen von *Cyclamen persicum* (Mill.).
(Experiments on the germination of *Cyclamen persicum* seed.)
Saatgut-Wirtsch., 1956, **8**: 47-51, bibl. 12, illus.

Germination of cyclamen seed was compared in standard compost and in a compost of 1 part of beach leaf soil to 1 part of peat. In standard compost germination percentages (at 18° and 20° C.) were higher, and seedling growth better, than in the beech leaf/peat compost. Rainwater had a poor effect on the germination of cyclamen seeds in peat and only abnormal seedlings were produced. When the peat medium was watered with tap water, 60% germination was obtained. Observations on 100 germinating seeds for 70 days showed that not all those emerging from the seed coat produced seedlings with normal roots.—Landwirtschaftskammer, Westfalen-Lippe.

2989. CLARK, M. R. M., AND PATON, A. M.
A new bacterial disease of dahlias caused by *Pseudomonas marginalis*.
Plant Path., 1956, **5**: 32-5, bibl. 9, illus.

Recent reports from the west of Scotland have indicated that a wet, black rot may be fairly widespread among dahlias. The disease is most troublesome on young cuttings in propagation beds but has also occasionally been seen on mature plants. The causal organism is considered to be *Pseudomonas marginalis*. A source of infection on one nursery was found to be the greenhouse water tank, but it was difficult to disinfect this. The bacteria proved very sensitive to streptomycin in the laboratory. In the field streptomycin, applied as a spray after planting or as a pre-planting dip, gave 36% control.—W. Scot. agric. Coll., Auchincruive, and School Agric., Edinburgh.

2990. HAWLEY, W. O.
Dioscoreas as ornamental foliage plants.
Nat. hort. Mag., 1956, **35**: 23-9, illus.

Some decorative vines have been selected from among the *Dioscorea* species being grown under the cortisone programme at Glenn Dale, Maryland. Several of these are described, and methods of vegetative propagation and culture are summarized.

2991. KRAGTWIJK, C.
Freesia. [In Dutch.]
Jversl. Proefst. Bloem. Aalsmeer 1954, pp. 63-77.

The average soil temperature was reduced by coverings of reeds or shade mats, but sawdust or chaff had little effect. Seed vernalization of the variety Buttercup resulted in reduced germination. Shading of young freesia plants had little effect on growth. A soil dressing of chaff had a good effect on the growth of Buttercup. Reduced soil temperatures resulted in earlier flowering, but flower quality was better with higher soil temperatures. Corm weight in Buttercup was improved by soil coverings of reeds or chaff. Cross-pollination between Buttercup and *refracta alba* produced more seed than self-pollination.

2992. VAN DE NES, A. G. A.
Temperatuurbehandeling bij fresiaknollen.
(Temperature treatment of freesia corms.)
Jversl. Proefst. Groent. Fruit. Glas, Naaldwijk, 1955, pp. 61-2, illus.

After storage of freesia corms at 31° C. for at least 9 weeks no continued dormancy was observed in the corms after planting out. There were slight varietal differences in the length of storage needed to promote the earliest flowering, and these were accentuated when warm storage was followed by cool storage at 13° C. Flowering became earlier as the cool storage period increased. The earliest flowering was induced by a combination of 13 weeks storage at 31° C., followed by 4 weeks at 13° C., but the number of marketable stems was reduced. The number of flowers produced per fluorescence was not markedly affected by cool storage.

2993. KOSUGI, K., AND SUMITOMO, A.
Studies on flower bud differentiation and development in freesia. III. Effects of day length. [Japanese, with English summary ¼ p.]
J. hort. Ass. Japan, 1955, **24**: 204-6, bibl. 10.

Day length was modified by shading or lighting both before and after flower bud differentiation in freesias. Shading advanced flower bud differentiation by about 10 days and increased the total number of flower buds. Lighting had no effect on flower bud differentiation, but reduced the total number of buds and promoted bud development to some extent. Shading and lighting both slightly increased plant height. [For Parts I and II see *H.A.*, 24: 663 and 25: 3107.]

2994. WOLTZ, S. S.
Boron nutrition of gladiolus.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 358-62, bibl. 5.

Borax, colemanite and fritted trace elements (FTE) were applied as sources of boron for gladiolus grown in a fine sand. Toxicity was shown after colemanite applications at 20, 40 and 80 lb. per acre, and borax at 36 and 72 lb. per acre. In recently matured leaves showing B deficiency symptoms there was about 10 p.p.m. B. From greenhouse sand cultures it was concluded that 10–15 p.p.m. B in recently matured leaves was probably the critical level. Deficiencies of N, P, K and Ca reduced the B content of older leaves. By increasing the substrate levels of K, the B content of the lower leaves was increased. Toxicity from B in the nutrient solution began at about 2 p.p.m. B. Toxicity symptoms in the older leaves occurred when B contents reached 150 to 200 p.p.m.—Gulf Coast Exp. Stat., Bradenton.

2995. KOVTUNENKO, I. P.
A new method of storing gladiolus corms. [Russian.]
Priroda, 1956, **45**(1): 100-2, illus.

Freshly harvested gladiolus corms, with their roots cut back but otherwise not cleaned, were laid on beds of damp sand in a cellar. The sand was kept damp and the temperature maintained at 2–5° C. throughout the storage period, at the end of which good healthy corms were planted out.

2996. Yasuda, I., and Yokoyama, N.
Biochemical studies on breaking the rest period of gladiolus corms. I. On the changes in sucrose, starch and crude protein content resulting from cold storage. [Japanese, with English summary ¼ p.]
J. hort. Ass. Japan, 1955, **24**: 207-10, bibl. 6.

In gladiolus corms stored at 5° C. for 20 to 30 days sucrose tended to increase and starch to decrease, but in some cases the trend was reversed. When corms were kept at 20° C. with high humidity, there was a slight tendency for sucrose to decrease, and after 20 days, but not after 10 days, some reducing sugars were present. Total nitrogen and crude protein decreased in tulip bulbs and freesia corms stored at low temperature, but there was no corresponding decrease in gladiolus corms.

2997. Ferguson, J., and Markley, B. B.
The masking of soil treatment effects from use of contaminated planting stock.
From abstr. in *Phytopathology*, 1955, **45**: 693.

Results from the methyl bromide fumigation of gladiolus land indicate that soil treatment can be expected to give the greatest improvement when used with highly susceptible, pathogen-free stock, but should also improve growth of less susceptible, pathogen-free varieties. Treatment may give no improvement, or may even result in yields lower than those of untreated plots, when used with infected stock. These results reveal the possible dangers from soil treatments that reduce the competing microflora, resulting in increased disease loss when infected stock is planted.

2998. Bald, J. G., and Markley, B. B.
Application of hot-water treatment to growers' lots of gladiolus cormels.
From abstr. in *Phytopathology*, 1955, **45**: 693.

Details are given of a hot-water treatment which gave control of *Fusarium* and other rots of gladiolus cormels on a commercial scale.

2999. Magie, R. O.
Hot water treatment for controlling gladiolus corm-borne pathogens.
From abstr. in *Phytopathology*, 1956, **46**: 19.

In tests under Florida conditions since 1953 of the hot water treatment recommended by Bald *et al.* [see preceding abstract] cormels of the common commercial varieties were sufficiently dormant to tolerate soaking for 30 minutes at 57·2° C., provided they were harvested between mid-April and early summer and treated 6–10 weeks after harvest. Small cormels were more tolerant than large ones. Small dormant corms of some varieties tolerated treatment at 55° C. for 30 minutes but were excessively injured at 1 hour. A 30-minute soak at 53·5° C. killed the following fungi in cormel-size pieces of diseased tissue cut from corms: *Fusarium oxysporum* f. *gladioli*, *Stromatinia gladioli* and *Curvularia lunata*.

3000. Magie, R. O.
Recent advances in controlling diseases of gladiolus.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 373-6, bibl. 4, illus.

In *Stromatinia*-infected plots the highest corm yields were obtained after treatment with Crag 974 and Terraclor. Hot water treatment of *Fusarium*-infected cormels can prevent contamination of "clean" soil. *Fusarium* survival was reduced in soil which had been submerged under water for one month, as compared with dry soil.—Gulf Coast Exp. Stat., Bradenton.

3001. Magie, R. O.
Gladiolus *Stromatinia* disease controlled by soil treatments and cultural methods.
From abstr. in *Phytopathology*, 1956, **46**: 19.

The gladiolus dry rot disease, *Stromatinia gladioli*, is severe on well-drained soils over large areas in Florida, root rot accounting for 90% of the damage it causes [see also *H.A.*, 25: 3113]. Terraclor (75% pentachloronitrobenzene), Vapam (sodium methyldithiocarbamate) and Crag Fungicide 974 (95% tetrahydro-3,5-dimethyl-2*H*-1,3,5-thiadiazine-2-thione) were effective in greatly reducing and delaying root infections and in producing flower crops when applied at 200 and 100 lb. per acre on heavily and lightly infested soils respectively. Maximum control was not obtained unless the soil was moist and a roto-tiller was used to work the chemicals into the soil. Plantings made before September 15 and after January 1 escaped the disease.

3002. Wells, J. C., and Winstead, N. N.
The reaction of twenty gladiolus varieties to five root-knot nematode species.
Plant Dis. Reptr, 1956, **40**: 177-8, bibl. 2.

Of the 20 gladioli most widely grown in North Carolina, only Elizabeth the Queen was resistant to all 5 *Meloidogyne* species. All varieties were resistant to *M. hapla*. Most were susceptible to *M. incognita* and *M. incognita* var. *acrita*.—N.C. St. Coll., Raleigh.

3003. Kelsheimer, E. G.
Control of nematodes in gladiolus corms.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 348-50, bibl. 1.

Treatment of gladiolus corms at the time of storage with parathion dust or an emulsion dip resulted in the highest percentage of nematode-free corms. Demeton and malathion were poor nematocides. Treatment just before planting with EPN, parathion, metasystox and chlorthion was also successful in controlling nematodes, whether the materials were used as dusts or dips.—Gulf Coast Exp. Stat., Bradenton.

3004. Winstead, N. N., and Skotland, C. B.
Eradicant treatments for narcissus bulbs and gladiolus corms harboring soybean nematode cysts.
From abstr. in *Phytopathology*, 1956, **46**: 31.

Of several steeping treatments tested, 0·5% formalin (45° C. for 3 or 4 hours) and hot water (48° C. for 30 minutes) killed unhatched larvae. A 30-minute pre-storage steep at harvest in 3–100 Dowicide B (85% sodium 2,4,5-trichlorophenoxide) killed the unhatched larvae in cysts and also gave effective control of the *Fusarium* bulb and corm rots of narcissus and gladiolus.

3005. Prihodjko, S. N.
A rapid method of multiplying hyacinths. [Russian.]
Sad i Ogorod, 1956, No. 4, pp. 65-7, illus.

Hyacinth leaves carefully cut off at the base and set at an angle of 65–50° in clean river sand at 18–25° C. begun to produce bulbs after 35–50 days. When rooted they were transplanted into pots or flats and grown on for 2 months. After the leaves had died off the bulbs were slightly dried and then planted out. From 1 mother plant 6–10 leaf cuttings can be taken, producing altogether 30 to 40 daughter bulbs. The best time for taking the cuttings was found to be the period immediately preceding flowering. Varieties found suitable for this method of propagation are listed.

3006. Plumier, W.
Essai d'application de phosphore radioactif (P32) sur *Hyacinthus orientalis*. Effet sur le pouvoir germinatif du pollen. **(The application of radioactive phosphorus to *Hyacinthus orientalis:* its effect on pollen germination.)**
Bull. Inst. agron. Gembloux, 1956, **24**: 71-7, bibl. 4.

Roots of hyacinth bulbs which had been growing in water were transferred to solutions containing radioactive P at several concentrations for different periods of time. In general the germination of pollen was reduced as the concentration of P^{32} increased.

3007. Rodionenko, G. I.
The iris seed and its characteristics. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1955, **104**: 653-6, bibl. 7, illus.

The results are outlined of investigations on the seeds of 22 *Iris* spp., some of which remained viable after 5–6 years' storage.

3008. Okada, M., and Okamura, A.
Effects of daylength on flowering of Japanese iris (*Iris kaempferi*). [Japanese, with English summary ⅓ p.]
J. hort. Ass. Japan, 1956, **24**: 261-4, bibl. 3, illus.

In a preliminary trial Japanese iris failed to flower when subjected to long-day artificial illumination from 1 September but did flower when treated from 1 October. This indicated that some short-day illumination before long-day treatment is essential for flowering. In another trial in which 4 lots received long-day illumination from 1 September to 1 April, except for periods of nil, 10, 20, and 30 days from 1 October, all flowered except that which received no short-day treatment. In a further experiment on the lot which had received no short photoperiod, long-day treatment was discontinued on 1 April, 1 May or 1 June without subsequent short-day treatment, or on 1 June with a subsequent short-day treatment for 15 or 30 days. All flowered in August except for those in which long-day illumination had been stopped on 1 June without subsequent short-day treatment. It was concluded that flowering in August was the result of exposure to natural short-day illumination in spring after the artificial long-day illumination had been discontinued on 1 April and 1 May, and that in those plants whose long-day treatment was discontinued on 1 June without subsequent short-day treatment failure to flower was due to lack of exposure to short-day illumination.

3009. Bakker, J.
Lelies. **(Lilies.)**
Jversl. Proefst. Bloem. Aalsmeer 1954, pp. 88-101.

Lilium regale: Bulbs stored best in moist peat; stem length and number of flowers produced declined with increased storage periods. Four-year-old bulbs produced more flowers than 3-year-olds. *L. henryi:* Bulbs damaged by frost were not affected in subsequent forcing. *L. pumilium:* Bulbs were forced in 3 months; 2-year-old bulbs of size 8–10 produced twice as many flowers as 3-year-old bulbs of the same size; bulbs smaller than size 6 were not worth forcing; soil heating hastened flowering by 14 days, but some of the flower buds dried out. *L. speciosum rubrum:* Soil heating hastened forcing by 4 weeks in comparison with cool-forced bulbs, but the average stem length and number of flowers was somewhat reduced; the best results with both methods of forcing were obtained with the largest bulbs (size 24+); colour and flower quality was better in cool-forced bulbs. *L. tigrinum fortunei:* Forcing time was reduced by longer bulb storage, which also reduced stem length and flower number.

3010. Bald, J. G., and Chandler, P. A.
Propagation from scales of treated Croft lily bulbs.
From abstr. in *Phytopathology*, 1955, **45**: 693.

Details are given of a succession of treatments (heat curing, soaking and chemicals) applied to Croft lily bulbs which eliminated pathogenic nematodes and all fungi causing lesions on bulbs or roots, except *Fusarium* sp. and a Phycomycete. These organisms were associated with characteristic small, reddish brown, sunken root lesions on many plants aand with typical *Fusarium* basal rot symptoms on 3 bulbs. The characteristic root rot of lilies forced in commercial greenhouses did not appear on the bulblet plants.

3011. Walker, G. W. R.
Seed production following selfing of some lily varieties.
Progr. Rep. hort. Div., centr. exp. Fm, Ottawa, 1949–53, pp. 61-2, bibl. 2.

In the group of varieties studied few or no seeds were produced on selfing. In the Edna Kean, Coronation and Spitfire varieties the application of α-naphthalene acetamide to a wound at the base of the ovary, made by tearing off a petal, increased seed production. Pollination of Addington, Coronation and Hurricane resulted in seeds only when pollination was accompanied by hormone treatment.

3012. Pape, H., and Domsch, K.
Zur Beizung von Maiblumenkeimen. **(On the disinfection of lily-of-the-valley crowns.)**
Gartenwelt, 1956, **56**: 121, illus.

Damage to lilies-of-the-valley was shown to be due to immersion of the crowns in a 0·5% methoxyethyl mercury chloride solution for as much as 1 hour. The treatment should be confined to 30 minutes at a strength of 0·25% or to 10 minutes at 0·5%.—Biol. Bundesanst., Kiel-Kitzeberg.

Lawns.

(*See also* 2698-2702, 2733, 3041r.)

3013. Jacobson, H. G. M., and others.
Lawns.
Circ. Conn. agric. Exp. Stat. **190**, 1955, pp. 27.

Advice is given on improving soil conditions, on making a new lawn including suitable seed mixtures, and on maintenance, weed control and pest and disease control.

3014. Couch, H. B., and Cole, H., Jr.
Five compounds tested for control of Merion bluegrass rust.
Plant Dis. Reptr, 1956, **40**: 103-5, bibl. 8.

Five compounds were tested against *Puccinia graminis* on the Merion variety of Kentucky bluegrass (*Poa pratensis*) in 1955. Acti-dione at 844 and 422 mg. and a Dithane mixture (1 qt. Dithane D-14 plus 12 oz. $ZnSO_4$ plus 4 oz. $CuSO_4$) applied in mid-August and again after 2 weeks at 4 oz. per 2 gal. water per 1,000 sq. ft. gave the lowest disease ratings, namely, 0·4, 0·7 and 0·8 respectively compared with 1·8 in the control. Both materials caused tip burn and chlorotic patching of the leaves but these symptoms were no longer evident after the first mowing. Acti-dione retarded growth for 7 days. Plots of common Kentucky bluegrass adjoining the heavily diseased Merion variety were entirely free of rust.—Pa agric. Exp. Stat.

Roses.

(*See also* 2416d, 2739, 2949-2952, 3041f.)

3015. National Rose Society of Great Britain.
The rose annual, 1956.
National Rose Society, London, [1956], 8 × 5½ in., pp. 199, illus., 8s. 6d.

Much of the annual is concerned with breeding, growing and showing roses in Britain and abroad. There is also an article on the National Rose Species Collection at Bayfordbury, and one on the Lady Mary Fitzwilliam family. Short notes are included on the use of *Rosa multiflora* as a shock absorber on motor highways and on the discovery of *R. bracteata* as a black-spot-resistant rose. Observations on the Shafter rootstock are reported from France. Among the illustrations are coloured photographs of 17 new varieties.

3016. Fisher, G. M.
Rose research report at Texas Foundation annual meeting.
Amer. Nurserym., 1955, **102**(2): 28-9.

This article includes a report on some rose experiments. The prevention and control of gall disease appears to be related to the handling of cuttings. Captan continued to give good control of black spot, and may be applied in combination with Omazene, which is effective against mildew. In waxing tests, bushes dipped for as long as 6 seconds into wax at temperatures up to 200° F. showed good survival and growth. Vancide 51 gave good mould control on stored bushes. Vapam has shown promise against nematodes and is also effective against weeds.

3017. Edwards, R. E.
A survey of rootstocks for roses.
B.Sc. Dissertation, Nottingham University, 1955, pp. (typescript) 137, bound, bibl. 128.*

This dissertation opens with the revealing statement that "prior to the publication of Ferguson's study of rose stocks (1933) it is apparent that no comprehensive survey of the subject of rootstocks in the genus *Rosa* had been made". Even this survey was made from a botanical rather than a horticultural point of view. It appears that only in 1951 was the subject reviewed from the growers' angle, by a worker at Iowa State college. Without having the American survey at hand for comparison it is not possible to judge how much new ground has been covered in the present work by R. E. Edwards, but the fact that it runs to 137 pages compared with only 16 in the American survey suggests that the contribution is considerable.

The world literature has been reviewed from the mid-seventeenth century onwards, and the author has tried to analyse and marshal into some sort of order the bewildering mass of individual opinions, observations and empirical results contained therein. Although the reader may at times lose his way in a jungle of conflicting evidence and look in vain for a guiding hand or a comfortable conclusion, this appears to be the fault of the material rather than of the author, and on the whole Mr. Edwards is to be congratulated on the manner in which he has tackled a very difficult problem. In the introduction he has dealt with the early preference for own-rooted roses, the reasons for the use of rootstocks and the history of rose rootstocks. He then discusses the reactions of individual stocks to various soil and climatic conditions, and their effect on pest and disease resistance in the scion and on varietal performance. It is clear that there is scope for detailed and fundamental work on stock-scion interactions comparable to that already carried out on fruit trees, as shown by the many scattered observations concerning stock effects on longevity, productivity, vigour and flower quality and colour in the scion. At present choice of stock appears too often to depend more on its nursery behaviour than on its influence on the rose variety or its adaptation to certain environmental conditions. With regard to disease resistance, the author mentions on p. 41 that "no reference has been traced to elucidate the disease which . . . came about 10 years ago to *R. rugosa* in the Boskoop area and caused there a changeover to the use of *R. multiflora* for polyantha potwork". In the 1947 and 1948 annual reports of the Boskoop research station, however, conclusive evidence is presented that this disease was caused by *Verticillium dahliae*, in spite of the fact that *R. rugosa* 'Effendee' was later found to be relatively resistant to the disease.

Section 3 deals with factors affecting the selection of rootstocks for various glasshouse and outdoor methods of culture, and section 4 with the propagation of rootstocks, including economic considerations and a discussion on the controversial question of the relative merits of seedlings and cuttings.

Of particular interest is a chapter on recent research. It is revealing to learn that in England, where the national emblem is the rose, "practically nothing has

* Copy can be consulted in library of the Dep. Hort., School of Agric., Nottingham Univ., Sutton Bonington.

yet been done to breed new stock varieties for particular purposes or localities, to standardise the existing ones or to investigate stock-scion interactions". The problems discussed in the earlier sections of the dissertation show how urgently such scientific work is needed. Some of these problems, however, are at last being methodically tackled, since in 1953 an extensive programme of work on rose rootstocks was started at the John Innes Institution at Bayfordbury. Considerably more research work is being done in countries abroad, particularly in America and Holland, on breeding hybrid rootstocks and on strain selection. One of the most valuable contributions of the present survey is to point out the most serious gaps in our knowledge and to indicate the aspects that most urgently require attention.

In addition to a useful bibliography, there is an appendix listing rose species and hybrids employed as rootstocks with notes on origins and uses, and another on some physiological and morphological factors affecting bud "take".

P.R.-D.

3018. Raabe, R. D., and Wilhelm, S.
Field studies of rose rootstock infections by the *Verticillium* wilt fungus.
From abstr. in *Phytopathology*, 1955, **45**: 695.

Investigations have indicated that rose rootstocks commonly known as Ragged Robin, Odorata Multiflora (thorny, Burr and Grifferaie forms) are very susceptible to wilt caused by *Verticillium albo-atrum*, that Dr. Huey (Shafter) is less susceptible, and that Manetti is resistant.

3019. VonAbrams, G. J., and Hand, M. E.
Seed dormancy in *Rosa* as a function of climate.
Amer. J. Bot., 1956, **43**: 7-12, bibl. 10.

The results of germination studies on 10 hybrid rose seed populations have been examined in relation to climatic variations during 30-day and 60-day periods before seed harvest. Seed dormancy was found to vary widely between the years and low temperature after-ripening was not a necessity for extensive germination. There was good correlation between germination and pre-harvest climate. Aseptic culture of excised embryonic plants provided high uniform germination in all 5 years of the study. When seed-bearing plants were transferred to a greenhouse compartment where they received high temperature and light, subsequent seed germination showed a marked reduction in dormancy compared with field-grown controls. [From authors' summary.]—Res. Div., Peterson-Dering, Scappoose, Oregon.

3020. Dimond, A. E., and Stoddard, E. M.
Toxicity to greenhouse roses from paints containing mercury fungicides.
Bull. Conn. agric. Exp. Stat. **595**, 1955, pp. 19, bibl. 3, illus.

Better Times, Briarcliff and related rose varieties have shown severe injury when the sash bars of greenhouses have been coated with paints containing di-(phenylmercuric)dodecenyl succinate (DPMDS), which emits a mercury vapour. Injury became severe when ventilators were closed for periods during cold weather. Mercury is accumulated by susceptible plants exposed to its vapour, and may be translocated in the plant from vegetative portions to the flowers. The liberation of mercury vapour from a DPMDS-containing paint film may be reduced by applying, on top of the film, 5 parts of dry lime-sulphur, formulated in a paste consisting of 10 parts wheat flour and 100 parts water. This coating showed no loss in effectiveness over a 15-day period, and in a commercial greenhouse has so far afforded protection for 5 months.

3021. McClellan, W. D., Taylor, E. A., and Smith, F. F.
Effect of fungicides in miticide-fungicide dust combinations on winter carry-over of the fungus causing blackspot of roses.
From abstr. in *Phytopathology*, 1956, **46**: 20.

Several fungicides were each used alone and with Aramite, ovotran, and malathion. The highest mean weight of flowers cut from the susceptible Golden Masterpiece variety were 1,071 g. with 3·4% Cu from basic copper sulphate plus 25% sulphur, 979 g. from 6·5% zineb and 946 g. from 7·6% ferbam plus 25% sulphur compared with 321 g. with no fungicide. The blackspot (*Diplocarpon rosae*) severity indices with these 3 fungicides on Golden Masterpiece in September 1954 and June 1955 were 40 and 32, 42 and 25, and 44 and 27 respectively, compared with 85 and 55 with no fungicide. Similar results were obtained with another susceptible variety. [See also *H.A.*, 26: 940.]

Other trees and shrubs.

(*See also* 2347, 2361, 2383, 2391, 2457, 2636, 2695, 2696, 3041a, b, k, o, q, t, v, y, z, 3042a, c, i, l, p.)

3022. Teuscher, H.
Der Rotahorn, *Acer rubrum*, und seine Vermehrung. **(Red maple, *Acer rubrum*, and its propagation.)**
Dtsch. Baumsch., 1956, **8**: 103-4.

For growing *Acer rubrum* as an ornamental tree select monoecious specimens with red fruits and pronounced red autumn colouring and bud these on *Acer saccharinum*. Raising seedlings is also practicable, but propagation by green wood cuttings is slow and expensive.—Montreal bot. Gdn.

3023. Schread, J. C.
Control of the andromeda lace bug.
Circ. Conn. agric. Exp. Stat. **194**, 1955, pp. 6, bibl. 1, illus.

The insecticides DDT, chlordane, lindane, heptachlor, aldrin, dieldrin and endrin gave excellent control of andromeda lace bug [*Stephanitis globulifera*] at all concentrations used. Serious reinfestation of treated shrubs occurred when untreated ones remained nearby. A distance of several hundred feet or more between treated and untreated plants prevented reinfestation. Treatments did not injure foliage. [Author's summary. See also *H.A.*, 24: 4143.]

3024. van der Zwaard, P.
Azalea. Teeltproeven. **(Azaleas: cultural trials.)**
Jversl. Proefst. Bloem. Aalsmeer 1954, pp. 34-6.

Cuttings were rooted in a medium of 2–3 parts sifted conifer soil with 1 part of conifer sawdust and with bottom heat of ±20° C. Rooting took place after about 4 weeks. The plants were grown in a mossy conifer soil, and were fertilized with brewers' grains. Fairly hard water has given satisfactory results with azaleas but the danger level has not yet been determined.

3025. Anon.
Treatment of freeze damage on azalea plants.
Nat. hort. Mag., 1956, **35**: 55.
Frost damaged basal bark of Kurume azalea plants was coated with melted paraffin, and pine straw was placed round the injured area. At the end of the season only 2·5% of the plants had to be cut back. Untreated plants continued to die back during the summer, and many succumbed to drought. After paraffin treatment of frost damaged *Ilex cornuta* rapid growth of callus was observed.

3026. Sampath, V.
Some observations on the propagation of *Camellia japonica* (Linn.).
Sci. and Cult., 1956, **21**: 451-3, bibl. 2.
In an experiment at Coonoor in 1950 semi-hardwood cuttings of *Camellia japonica*, 8 in. long and about 0·5 cm. thick, were planted each month throughout a year after treatment with growth substances and/or pre-callusing. The best results were obtained during the rainy months of June/September with all treatments, and by dipping in Hortomone A solution plus pre-callusing, the highest strike, 80%, being obtained in August. In another experiment leaf cuttings were planted in pure sand in July and August. In both cases 50% success was obtained; rooting took place 2–3 months sooner than with the semi-hardwood cuttings and early growth was more vigorous.—Raj Bhavan, Ootacamund.

3027. Anzalone, L., Jr., and Baxter, L. W.
Protecting camellia grafts with fungicides.
From abstr. in *Phytopathology*, 1956, **46**: 6–7.
In tests in 1954 with 5 camellia varieties grafted on the sasanqua variety Texas Star the average "take" in plants dipped in 3% captan, 3% ferbam and undipped was 97, 92 and 81% respectively, the averages for the two most difficult varieties being 100, 94 and 60% respectively. Among conclusions drawn from tests in 1955 was that dipping in 4–4–50 bordeaux is injurious.

3028. Anzalone, L., Jr., and Plakidas, A. G.
Fungicides for control of dieback of camellias.
From abstr. in *Phytopathology*, 1956, **46**: 7.
Previous studies showed that infection by *Glomerella cingulata* occurs primarily through the scars of abscissing leaves. In a laboratory test on freshly made leaf scars inoculated after fungicidal treatment the infection rates with 4–4–50 bordeaux, 3% captan and no treatment were 29, 47 and 82% respectively. In another test in which fungicidal treatment preceded leaf removal the corresponding figures were 16, 35 and 69% respectively.

3029. Wezenberg, H. J., Scholten, G., and van der Zwaard, P.
Euphorbia fulgens. [In Dutch.]
Jversl. Proefst. Bloem. Aalsmeer 1954, pp. 58-61.
No great differences in growth and flowering were observed after manurial applications, although farmyard manure was definitely beneficial. Soil steaming was very effective against foot rot fungus (*Fusarium solani*), and captan and TMTD also gave promising results. Tar oil sprays made little difference to foot rot attack but injured *Euphorbia* roots.

3030. McFadden, S. E., Jr.
New hybrids of American *Hibiscus* spp.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 366-9, bibl. 2.
Cross-pollinations have been made between native species and also between cultivated selections. Among the seedlings produced height and flower form has varied widely. In certain hybrid seedlings derived from "Red Glory" the length of time the flower remains open has been improved.—Fla agric. Exp. Stat., Gainesville.

3031. Edson, S. N., McElwee, E. W., and Gaskins, M. H.
Effects of readily available N, P_2O_5 and K_2O levels on growth and numbers of blooms of hibiscus plants.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 338-41, bibl. 9.
Hibiscus rosa-sinensis responded to N, plant growth and size increasing with increased doses up to a maximum of 50 p.p.m. of available N in the soil. Plants receiving relatively high rates of P_2O_5 were darker green, more compact and produced more flowers than plants receiving low levels of P_2O_5. Increased increments of K_3O resulted in increased plant size, but flowering was increased to a lesser extent than by P_2O_5 increments. The fertilizer ratios suggested for hibiscus are 1–2–2 or 1–2–3.—Univ. Florida, Gainesville.

3032. Westgate, P. J., and Miller, H. N.
Molybdenum deficiency of hibiscus.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 335-8, bibl. 6, illus.
Strap-leaf of hibiscus, which occurs on acid sandy soils in Florida, was corrected by leaf and soil applications of 5 g. molybdic acid or sodium molybdate in 1 gal. water per plant. A lime dressing prolonged the effect of Mo treatment.—Centr. Fla Exp. Stat., Sanford, and Fla agric. Exp. Stat., Gainesville.

3033. Marchal, J., and Wezenberg, H. J.
Hortensia. (Hydrangeas.)
Jversl. Proefst. Bloem. Aalsmeer 1954, pp. 81-5.
Completely dormant plants could be held at ½–1° C. for 6 months, and then forced for about 10 weeks when normal-sized flowers were produced. The German Einheitserde (standard compost), Vinkeveen and Wilnisser composts gave the best growth results. Agricultural lime at 600 g./sq. m. had a good effect on flower colour.

3034. Zalewska, Z.
Rokitnik zwyczajny (*Hippophaë rhamnoides* L.). **(The sea buckthorn (*Hippophaë rhamnoides* L.).)** [English and Russian summaries ½ p. each.]
Ann. Sect. dendrol. Soc. bot. Pologne, 1955, **10**: 353-76, bibl. 11, illus.
The sea buckthorn is used in Poland as an ornamental hedge plant, as a source of vitamin C and for stabilizing loose soils. Notes are given on propagation.

3035. Huckenpahler, B. J.
Auxins fail to stimulate rooting of yellow-poplar cuttings.
Bot. Gaz., 1955, **117**: 73-5, bibl. 10.
Cuttings of *Liriodendron tulipifera* were taken at 7 different times of the year from a large number of trees, and were treated with IBA, IAA and NAA. None of the treatments induced rooting.—South. Forest Exp. Stat., New Orleans, La.

3036. Marchal, J., and Wezenberg, H. J.
Sering. **(Lilac.)**
Jversl. Proefst. Bloem. Aalsmeer 1954, pp. 120-3.
Pre-treatment of lilac shrubs for 4 weeks at −2° C., or for 4–5 weeks with aircooling resulted in easier forcing and better quality flowers. Flowering was retarded by shrub storage from February to August at −2° C. The flower colour of the variety Lavaliensis was improved by the use of Wilnisser standard soil compost, leaf mould or alum.

3037. Munnecke, D. E.
Physiologic leaf spot of *Philodendron hastatum*.
From abstr. in *Phytopathology*, 1955, **45**: 694.
Leaves of *Philodendron hastatum* often have exuding spots, frequently necrotically ringed, that appear to be of bacterial origin. The spots and sooty moulds growing on their exidate often make plants unsaleable. Investigations indicate that the disease is caused by saprophytic bacteria that colonize plant exudations stimulated by high fluctuating temperatures (cool nights, hot days). *Best control* was obtained by growing plants under moderate temperature fluctuations and by spraying bi-weekly with captan to control sooty moulds.

3038. Miller, H. N.
Investigations with antibiotics for control of bacterial diseases of foliage plants.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 354-8, bibl. 5.
Antibiotic control of bacterial leaf and stem rot of *Philodendron* was tested using 3 commercial formulations of streptomycin. At concentrations up to 600 p.p.m. no phytotoxicity was observed. The antibiotics were more effective as preventive than as eradicant sprays. Agrimycin at 200 p.p.m. applied 48 hours before infection prevented symptom development, and Phytomycin at 400 p.p.m. was almost equally effective. One application of Agrimycin at 400 p.p.m. after symptoms became apparent prevented further disease development. On naturally-infected plants Agrimycin sprays at 200 p.p.m. repeated at 4-day intervals gave the most effective control. Soil drenches of antibiotics were not absorbed and translocated in sufficient amounts to affect disease development.—Fla agric. Exp. Stat., Gainesville.

3039. Marchal, J.
***Prunus triloba*.** [In Dutch.]
Jversl. Proefst. Bloem. Aalsmeer 1954, pp. 101-8.
Forcing of *Prunus* shrubs was possible when the plants had been given 4 weeks cold treatment at ½–1° C. Flowering was retarded by storing the shrubs in plastic bags for 6 months at −2° C., but the branch tips tended to die back during storage. Grafting wood was stored successfully for 2–3 months in dry peat. Top-working restored shrub form after pruning branches injured by *Enarmonia* moths.

3040. Rhododendron-Gesellschaft, Bremen.
Rhododendron und immergrüne Laubgehölze. Jahrbuch 1955. **(Rhododendron and evergreen woody plants. Yearbook 1955)**, Rhododendron-Gesellschaft, Bremen, pp. 69, illus.
The yearbook includes articles on rhododendrons in Sweden and Switzerland, large-flowered rhododendron hybrid varieties, evergreens from Mount Hakkoda, and rhododendron breeding.

Noted.

3041.

a Ahrendt, L. W. A.
A new dwarf barberry from Nepal.
J. roy. hort. Soc., 1956, **81**: 135.
Berberis mucrifolia.

b Alcorn, S. M., and Ark, P. A.
Translocation of streptomycin and tetracycline in cuttings of *Pyracantha*.
From abstr. in *Phytopathology*, 1955, **45**: 692.
Measured by response of insulated *Erwinia amylovora.*

c Alston, R. E.
A study of anthocyanidins produced in *Impatiens balsamina* under the influence of genes determining color types.
Diss. Abstr., 1955, **15**: 2390, being *Publ.* 14644 of 101 pp.
Chemistry of flower pigments.

d Anon.
Inheritance of flower color in tetraploid antirrhinum.
Progr. Rep. hort. Div., centr. exp. Fm, Ottawa, 1949-53, pp. 59-61, bibl. 5.

e Anon.
How to grow begonias and gloxinias.
Circ. Univ. Wis. Ext. Serv. **496**, 1955, pp. 6, illus.
Raising from seeds or tubers, summer care and tuber storage.

f Anon.
***Rosa chinensis semperflorens*—survives in Bermuda.**
[*Mimeo. Publ.*] *Bermuda News Bur.*, undated, p. 1, illus.
A parent of many modern varieties, thought to be extinct.

g BERNINGER, L. M., AND BECK, G. E.
Spring bulbs.
Circ. Univ. Wis. Ext. Serv. **504**, 1955, pp. 10, illus.
For the amateur.

h BHATNAGAR, G. S.
Studies on the biology of *Jasminum sambac* (proper).
Sci. and Cult., 1956, **21**: 613-15, bibl. 2, illus.
The flowers of 5 varieties described and illustrated.

i BOSLEY, D.
Growing gladiolus.
Ext. Folder N.C. agric. Ext. Serv. **120**, 1956, 1 folded sheet, illus.

j BRIDGMAN, F.
Sturt peas for your garden.
J. Agric. W. Aust., 1955, **4**: 697-700, illus.
Cultural notes on the indigenous *Clianthus formosus*.

k BROWICZ, K.
Klony japońskie w Polsce. (**Japanese maples in Poland.**) [English and Russian summaries ½ p. each.]
Ann. Sect. dendrol. Soc. bot. Pologne, 1955, **10**: 377-99, bibl. 12, illus.
Acer spp. classified according to frost hardiness.

l CARRA, P., AND DESVERNES, P.
Longévité des semences. (**Longevity of seeds.**)
Rev. hort. Algér., 1956, **60**: 17-23.
Results of germination tests on 39 herbaceous and woody ornamentals tabulated.

m CHABERT, G.
Les dégâts causés par la vague de froid sur la végétation de la région de Toulon-Hyères. (**Damage caused by the cold spell to plants in the Toulon-Hyères region [South of France].**)
Rev. hort. Paris, 1956, **128**: 1454-9.
In February 1956; responses of 240 ornamental and fruit crops tabulated.

n CHISHOLM, M. J., AND HOPKINS, C. Y.
Composition of delphinium seed oil.
Canad. J. Chem., 1956, **34**: 459-64, bibl. 12.
From seed of *D. hybridum* (Hort.).

o CONNORS, C. H.
Growing holly.
Circ. N.J. agric. Exp. Stat. **569**, revised 1955, pp. 8, illus.
A guide for home planting of *Ilex opaca*.

p CONNORS, C. H.
Peonies in the garden.
Circ. N.J. agric. Exp. Stat. **570**, revised 1955, pp. 8, illus.
Cultivation, classification and varieties, and reasons for not flowering.

q DAVIS, S. H., JR., AND HAMILTON, C. C.
Diseases and insect pests of rhododendron and azalea.
Circ. N.J. agric. Exp. Stat. **571**, revised 1955, pp. 30, illus.
Symptoms and control.

r FLEMING, W. E.
Controlling the Japanese beetle.
Fmrs' Bull. U.S. Dep. Agric. **2004**, revised 1955, pp. 13, illus.
In lawns, etc.

s GAARDER, P.
Dahlia. Sortskritikk fra sommeren 1955. (**Dahlia variety trials 1955.**)
Gartneryrket, 1956, **46**: 158-60, illus.
Short descriptions of many varieties.

t GRAY, H.
Pruning, training ericaceous plants.
Amer. Nurserym., 1956, **103**(3): 99-104.

u HAHN, E.
Neuere Schnitt- und Topfvergissmeinnicht. (**New forget-me-nots for cutting and for pots.**)
Gartenwelt, 1956, **56**: 93-4, illus.
Varieties of *Myosotis alpestris, M. oblongata* and *M. hybrida* for forcing.

v HARRIS, J. H.
Arrangement: trees and shrubs.
Ext. Circ. N.C. agric. Ext. Serv. **392**, 1955, pp. 14, bibl. 3, illus.
For landscape planting.

w HENTSCHEL, G.
Ein Beitrag zur Phänologie der Schneeglöckchenblüte. (**A report on the phenology of snowdrop flowering.**)
Angew. Meteorol., 1951, **1**: 43-53, from abstr. in *Bibl. dtsch. Wetterdienst.* **3**, 1955, No. 268.

x KNAPP, R.
Über den Verlauf der Keimung von einigen Gräsern, Leguminosen und *Iberis amara* bei unterschiedlichen Temperaturen. (**Germination of some grasses, legumes and *Iberis amara* at various temperatures.**)
Angew. Bot., 1955, **29**: 125-38, bibl. 13.
Candytuft, lawn grasses, etc.

y KNIGHT, F. P.
The choice and care of trees for the small garden.
J. roy. hort. Soc., 1956, **81**: 166-74, illus.
A lecture by the Director, R.H.S. Gardens, Wisley.

z LEWIS, C. E.
Uses of flowering and Asiatic dogwoods.
Amer. Nurserym., 1956, **103**(6): 10-11, 64-6, illus.
Cornus spp.

3042.

a MACCARIO, G.
La coltivazione industriale delle Acacie. (**The commercial cultivation of acacias.**)
Ital. agric., 1956, **93**: 208-26, illus.
Australian species grown for cut flowers in Italy.

b MCELWEE, E. W.
Fertilization of ornamental plants.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 376-8, bibl. 7.
A review of work on the nutrition of nursery stock and flower crops in the U.S.A.

c MARCUSSEN, K. H.
Hydrangeas in gardens and pots and tubs.
N.Z. J. Agric., 1956, **92**: 95-102, illus.
Soils, culture, propagation, pruning and varieties.

d MARKGRAF, F.
Aphelandra punctulata, eine neue Zierpflanze (Acanthacee). (***Aphelandra punctulata*, a new ornamental plant (Acanthaceae).**)
Gartenbauwiss., 1955, **2**: 328-9.
A botanical description of *Aphelandra fusco-punctata* Markgraf n.sp.

e MINISTRY OF AGRICULTURE, LONDON.
Commercial dahlia growing.
Adv. Leafl. Minist. Agric. Lond. **406**, amended 1955, pp. 6.

f DE MOL VAN OUD LOOSDRECHT, W. E.
Der Einfluss der Röntgenstrahlen auf Entwicklung des Pollens und der Sprosse bei Tulpen. IV. Der Einfluss der Temperatur (William Pitt, Roi d'Islande). (**The effect of X-rays on the development of pollen and stems in tulips. IV. The effect of temperature (William Pitt, Roi d'Islande).**)
Gartenbauwiss., 1955, **2**: 301-27, bibl. 33.
Earlier parts noted in *H.A.*, 26: 2053u and w.

g NORDSTRÖM, C. G., AND SWAIN, T.
The flavonoid glycosides of *Dahlia variabilis* II. Glycosides of yellow varieties Pius IX and Coton.
Arch. Biochem. Biophys., 1956, **60**: 329-44, bibl. 21.
For earlier work see *H.A.*, 23: 4488r and 24: 661.

h OLIVER, R. W.
Annual flowers for Canadian gardens.
Publ. exp. Fms Serv., Dep. Agric., Canada **796**, revised 1955, pp. 32, illus.
Notes on culture and descriptive list.

i PATON, M. R.
A new disease of rhododendrons.
Gdnrs' Chron., 1956, **139**: 233, illus.
For an earlier account of petal blight see *H.A.*, 24: 4159.

j SCHULZ, P.
Grow plants under fluorescent lights.
Brooklyn bot. Gdn Rec., 1955-56, **11**: 252-5, illus.
Adapted for house plants.

k SCHWEMMLE, J., AND SIMON, R.
Der Samenansatz bei Oenotheren-Kreuzungen. (**Seed setting in *Oenothera* crosses.**)
Planta, 1956, **46**: 552-68, bibl. 6.

l SEALY, J. R.
A new species of *Camellia* from Hong Kong New Territory.
J. roy. hort. Soc., 1956, **81**: 181-3.
The handsome *C. granthamiana* described.

m SHEEHAN, T. J.
Breeding *Cattleya* tribe orchids.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 378-86, bibl. 9, illus.

n VAN SLOGTEREN, D. H. M.
The preparation of antisera against carnation mosaic virus.
Meded. Lab. Bloemboll. Lisse **97**, undated, pp. 2.

o STAHN, B.
Das sogenannte Erica-Sterben und seine vermutlichen Ursachen. (**So-called "erica death" and its probable cause.**
Dtsch. Gartenb., 1956, **3**: 79-81, bibl. 13, illus.
The fungus *Pestalotiopsis versicolor* is suspect; no control mentioned.

p STANION, R. O.
The transplantation of mature trees.
Park Administ., 1956, **20**: 424-7, illus.
Successfully applied to 65-year-old plane trees.

q VINCENT, S.
L'agencement des formes et des couleurs dans le jardin privé. (**Arrangement of forms and colours in the private garden.**)
Agriculture, Quebec, 1956, **13**(1): 13-15, illus.

r YOUNG, A. J. A.
Chrysanthemums at any season.
Comm. Gr, 1956, No. 3143, pp. 403-5, and No. 3144, pp. 445-7, illus.
Canadian and U.S. methods.

SUB-TROPICAL FRUIT AND PLANTATION CROPS.

Avocadoes.

(*See also* 2722, 3119b, j.)

3043. WALLACE, A., AND SMITH, R. L.
Use of radioactive potassium in soil-plant studies.
Bett. Crops, 1956, **40**(1): 15-20, 43-7, bibl. 9, illus.

Radioactive K was applied to citrus and avocado plants in soil cultures. Fertilizer K was uniformly distributed throughout all the leaves a few hours after application. At a soil temperature of 75° F. K absorption was greater than at 65° F., but absorption decreased again at 88° F. The influence of adding excess lime to the soil on K uptake by citrus was partly related to plant size, but in general the excess lime effect was negligible. In avocadoes the presence of lime stimulated K absorption by Mexicola, but decreased it for Hass. In this short-term study citrus rootstocks had only a slight effect on K uptake. Nitrogen deficiency resulted in decreased K uptake.—Univ. Calif., Los Angeles.

3044. ZENTMYER, G. A., AND BINGHAM, F. T.
The influence of nitrite on the development of *Phytophthora* root rot of avocado.
Phytopathology, 1956, **46**: 121-4, bibl. 16.

The glasshouse and laboratory experiments described produced no evidence that nitrite predisposes avocado

roots to infection by *Phytophthora cinnamomi* [see also *H.A.*, 26: 2065], but showed that excessive soil moisture is apparently an important factor in the disease syndrome. [From authors' summary.]—Univ. Calif., Riverside.

3045. Young, T. W., and Ruehle, G. D.
Burrowing and meadow nematodes on avocados and mangos.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 288-92, bibl. 6.

Further results from field and laboratory studies [see *H.A.*, 25: 3171] have indicated that in general avocadoes are more tolerant to attack by the burrowing nematode (*Radopholus similis*) than is citrus. Growth of inoculated seedlings was not retarded until about a year after inoculation. No decline of mangoes caused by parasitic nematodes has been observed.—Sub-trop. Exp. Stat., Homestead.

3046. Soule, M. J., Jr., and Harding, P. L.
Relation of maturity of Florida avocados to physical characters.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 303-8, bibl. 3.

In the 1954-55 season several samples of fruit of 31 avocado varieties from different groves were tested for maturity and quality. The number of days required for softening at 80° F. varied from 1 to 7. Loss in weight during softening ranged from less than 2% to 8%. Large fruits had a higher flavour rating than small fruits of the same variety, and this trend remained fairly constant throughout the season. There appeared to be a straight-line relationship between picking date, fruit weight and diameter, and flavour rating from immaturity to post-maturity for Lula, Booth 8, Booth 7, Hickson, Taylor and Booth 1 varieties. Percentage loss in weight and number of days required for softening were not closely related to flavour.—U.S. Dep. Agric., Orlando.

3047. (Biale, J., and Young, R.)
Cause of mysterious avocado damage found.
Citrus Leaves, 1956, **36**(3): 11.

Improper ripening and discoloration of avocado fruits have been caused by exposure to high temperatures (77° F.+) after picking. Storage temperatures between 59° and 68° F. appear to be ideal for ripening.

Citrus—propagation and rootstocks.

3048. Singh, L. B., and Singh, R. N.
Studies in nucellar seedlings of some common rootstocks for citrus.
Indian J. Hort., 1955, **12**: 53-7, bibl. 8.

In a study of the relative numbers of nucellar and gametic seedlings produced by 10 different rootstocks *Jamberi* rough lemon, Italian lime and Rangpur lime yielded the highest percentages of nucellar seedlings, namely 91, 85 and 82 respectively. There was no relationship between the percentage of seeds producing more than one seedling and the percentage of nucellar seedlings. Both the nucellar and the gametic seedlings occurred mainly in the form of multiple seedlings.—Hort. Res. Stat., Saharanpur.

3049. Dikshit, N. N.
Propagation of Kagzi lime (*Citrus aurantifolia* Swingle) by cuttings.
Sci. and Cult., 1956, **21**: 536, bibl. 4.

Kagzi lime cuttings 9 in. long and ¼ in. thick were taken in July, dipped in β-IAA at various concentrations from nil to 450 p.p.m. for 24 hours and then planted in sand. The best results were given by 250 and 300 p.p.m., namely 65% rooting compared with 45% in the controls.—Fruit Res. Stat., Saharanpur.

3050. Marloth, R. H.
Rootstocks for lemons.
Fmg S. Afr., 1956, **31**: 9-13, bibl. 7, illus.

Trials of rootstocks for Lisbon lemons were started at Nelspruit in 1930. The results and conclusions must be regarded as tentative, because the effects of soil type, cultural treatments and virus diseases are not known. After 16–20 years the trees were in too poor a condition to be of commercial value. On sweet rough lemon trees grew and produced well for about 10 years, when they started to decline; trees on ordinary rough lemon declined more slowly. At 14 years old the trees in the best condition were those on tangelo, grapefruit and sour orange. On light soils trees on rough lemon during the first 7 years of cropping bore 60 lb. per tree per year more than those on sweet orange. Yields from trees on sour orange were similar to those from sweet orange, those from Villafranca lemon were half those from rough lemon, while on sweet lime and yuzu yields were only a quarter of those on rough lemon stocks. During the second 7-year period yields from trees on ordinary rough lemon were 80 lb. per tree per year higher than from sweet orange. Tree performance during the 14 years was so poor on Villafranca lemon, sweet lime and yuzu that they are considered unsatisfactory for commercial use. Fruit from trees on rough lemon had a thicker rind and lower juice contents of total soluble solids and acid than fruit from trees on sweet orange.

3051. Bajwa, B. S., and Nagpal, R. L.
Citrus rootstock trials in the Punjab. V. The influence of different rootstocks on vigour and cropping of Marsh Seedless grapefruit.
Indian J. Hort., 1955, **12**: 91-107, bibl. 3.

A progress report is given on the trials started at Montgomery in 1937 [see *H.A.*, 19: 534] on the influence of *Kharna Khatta*, rough lemon, sweet lime, citron and shaddock rootstocks, propagated both from seeds and cuttings, on the tree vigour and cropping of Marsh Seedless grapefruit. The initial advantage in tree size and cropping on vegetatively propagated rootstocks noticed in the first seven years of the life of the tree persisted during the further 3-year period, but on the whole the relative growth rate was lower than on seedling rootstocks. The vegetatively propagated rootstocks induced consistently higher yields and better growth than did apogamic seedling stocks. The trees on *Kharna Khatta* gave the highest annual and cumulative yields and those on sweet lime and citron the lowest. The trees on rough lemon were the largest and those on sweet lime and citron the smallest. *Kharna Khatta* imparted the greatest vigour to the plants in the nursery stage, but the growth rate after planting out was lower than on rough lemon.

Citrus—nutrition.

(*See also* 2361, 2363, 2416d, 2866c.)

3052. Willson, A. E., Arey, W. J., and Bistline, F. W.
Errors in citrus soil and leaf sampling procedures.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 107-12, bibl. 10.

Soil and leaf analysis sampling methods were evaluated for sources of variation. Variations in leaf samples were relatively small. The over-all variability of the soil sampling procedures for Ca and Mg may be reduced by duplicating the rapid chemical analysis on different days. Samples from just outside the zone of leaf drip were more efficient than samples from the alleys. Leaf sample data for K_2O and Ca were shown to have adequate precision for the development of control methods for citrus within the ranges supplied in the literature.—Minute Maid Corp., Plymouth.

3053. Lynch, S. J., and Mustard, M. J.
Studies on the unfruitfulness of Minneola tangelos in Dade county.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 299-301, bibl. 12.

Preliminary trials with fertilizers and fruit-setting agents have been started on Minneola tangelos on rough lemon stocks. The greatest increase in fruit set resulted from the highest N applications (6%) which also produced the best tree condition. The addition of extra K to the standard N dose tended to depress fruit set and gave poorer tree condition than when K was omitted. No definite conclusions were drawn from results with B and sugar sprays applied during flowering.—Univ. Miami, Coral Gables.

3054. Smith, P. F., and Reuther, W.
Preliminary report on the effect of nitrogen source and rate and lime level on pH, root growth, and soil constituents in a Marsh grapefruit grove.
Citrus Mag., 1956, **18**(6): 20-3, 26, bibl. 6.

Soil samples taken to a depth of 5 ft. were analysed 2½ years after the start of the experiment. Nitrogen supplied as ammonia lowered soil pH, particularly in the 6–12 in. layer. Ammonium sulphate was considerably more acidifying than ammonium nitrate when both were compared with calcium nitrate. Root growth was not affected by the several treatments. Increased rates of N application, except of calcium nitrate, slightly lowered pH values. High dolomite lime applications greatly raised the pH of the top 6 in. and slightly raised subsoil pH. At the high rate of liming Mg, K and nitrate contents were increased to a depth of 5 feet, but Ca increased appreciably only in the top 6 inches.—Hort. Field Sta., Orlando, Fla.

3055. Sites, J. W., Wander, I. W., and Deszyck, E. J.
Nitrogen sources as related to yield and quality of Hamlin oranges. (A ten year summary.)
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 65-72, bibl. 6.

Field trials were conducted on mature Hamlin orange trees to determine the effect of N, supplied from 6 different sources, on yield and fruit quality. Data accumulated over 10 years showed that trees supplied with N from ammonium sulphate and ammonium nitrate produced fruit of the best internal quality. Size of fruit and vitamin C content were increased when the total N supply was reduced by half, but yields were significantly reduced. When ammonium sulphate was continually supplied, so that soil pH dropped below 5·5, tree condition and yields deteriorated.—Fla Citrus Exp. Stat., Lake Alfred.

3056. Jones, W. W., and Embleton, T. W.
The relation of potassium to fruit size in oranges.
Bett. Crops, 1956, **40**(4): 22-5, bibl. 12.

In a review of some American work on this subject it is shown that in general fruit size increases with K supply, but there are exceptions. Potash applications have also been shown to reduce fruit size when Mg is in or near the deficiency range. Water may become the limiting factor for fruit size, in which case the relation between fruit size and K may be either positive or negative.

3057. Smith, R. L., and Wallace, A.
Cation-exchange capacity of roots and its relation to calcium and potassium content of plants.
Soil Sci., 1956, **81**: 97-109, bibl. 20.

The cation-exchange capacity of roots of citrus, avocado, beans and barley was determined on an area and a weight basis. Root cation-exchange characteristics were found to be the same on living and non-living roots, and on metabolically active or inactive roots. Symmetry values for Ca or K of excised roots of sour orange, grapefruit, trifoliate orange, rough lemon, peach, beans and barley showed little correlation with Ca and K contents of the plants, although the cation-exchange capacity of the roots had some influence on relative uptake. As a means of evaluating the influence of root "density of charge" on cation uptake, the ratio of root cation-exchange capacities of 2 plant species grown under similar conditions was compared with the ratio of their respective Ca or K contents. For plants grown in soil of low nutrient level the ratio of Ca content of both species was shown to be related to the square root of the ratio of their respective root cation-exchange capacities. The ratio of K content of these same plants bore a closer relation to the reciprocal ratio of their root cation-exchange capacities.—Univ. Calif., Los Angeles.

3058. Ali, M., Ali, S., and Musahib-ud-Din.
Vigour and productivity as affected by trace elements in citrus.
Punjab Fruit J., 1955, **19**: 53-4.

Foliar sprays of Zn, Mn, Fe, Cu and Co were applied 3 times per year to Pineapple orange trees on rough lemon which were growing in a sandy loam soil of pH 8·4. Tree vigour was not affected. Fruit set was increased by February sprays of Cu. June drop was decreased by 4·5% by Zn and Mn, and was increased by Cu, Fe, and Co. Yields did not show any significant differences in the year following application, but the crop in the next year responded, Zn giving significantly higher yields, and Fe and Co rather better yields, than did Mn and Cu. Fruit quality was improved by all

sprays except Cu. Sprays of Zn and Fe resulted in improved colour and in higher density and non-reducing sugars in the juice. The Mn sprays improved taste and flavour, and rind, rag and colour, while Co sprays increased significantly the vitamin C content of the juice.—Punjab agric. Coll., Lyallpur.

3059. Smith, P. F.
Relation of boron level to the production of fruit quality of grapefruit and oranges.
Citrus Ind., 1956, **37**(3): 5-8, 18, bibl. 10.

Various borax levels have been applied to oranges and grapefruit since 1951. The treatments have not had any favourable effects on growth or yield, but have induced biennial bearing in certain years. In grapefruit the higher B concentrations increased leaf size and affected K, Ca and Mg concentrations; similar changes were not apparent in orange leaves. High B application was associated with reduced Mn content in both orange and grapefruit leaves. Juice contents of citric acid and of vitamin C were consistently lowered by high B, except in Temple orange which showed no citric acid loss. Total soluble solids were generally unaffected by the treatment. The ratio of solids to acids tended to be higher with increased B, but the differences were usually small.—U.S.D.A., hort. Field Stat., Orlando, Fla.

3060. Leonard, C. D., and Stewart, I.
Longevity of chelated iron treatments as applied to citrus trees.
Citrus Ind., 1956, **37**(3): 12-16, bibl. 3.

Application of FeEDTA at 20 g. Fe per tree to chlorotic Valencias growing on acid soil corrected chlorosis within 2 months, but there was a substantial return of chlorosis in the new spring flush 27 months after treatment. Mixing the chelate (at 20 g. Fe/tree) with phosphates, dolomite or mixed fertilizer did not reduce its effectiveness. Four formulations of chelates applied at 20 g. Fe/tree to chlorotic orange trees on acid soil resulted in little difference in leaf Fe contents. Orange trees on a calcareous soil given a single application of FeEDTA-OH at 40 g. Fe/tree were still green 30 months after application, when trees which had received 20 g. Fe/tree were showing mild chlorosis.—Citrus Exp. Stat., Lake Alfred, Florida.

3061. Anon.
Essais d'oligoéléments. **(Minor element trials.)**
Rapp. Cons. Exp. Rech. agron. Algér. 1954, 1955, pp. 62-5.

Mature clementine and mandarin trees have been sprayed annually in May since 1951 with 0·5% manganese sulphate plus 0·25% lime. Treatment has improved leaf colour and yields, especially in the clementines.

3062. Stewart, I., Leonard, C. D., and Edwards, G.
Factors influencing the absorption of zinc by citrus.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 82-8, bibl. 3, illus.

Radioactive Zn applied to orange trees in the field was absorbed from both the upper and lower surfaces of the leaves and from the bark of twigs. Zinc absorbed through the leaves moved toward the tips of those leaves, but there was no indication of its movement into the surrounding leaves. Zinc applied to the bark moved into most of the leaves on the twig. During the post-blossom period Zn was readily taken into the new leaves, but absorption was practically nil during the dormant season. Commercial Zn sprays, containing oxides, carbonates and various forms of precipitated zinc sulphate, were found to move very slowly into the leaves in comparison with soluble Zn salts. A survey of 182 groves showed that the average Zn content of the leaves was 34 p.p.m. There was little effect of location, variety or rootstock on Zn content of the leaves.—Fla Citrus Exp. Stat., Lake Alfred.

Citrus—water and temperature effects.

3063. Reitz, H. J., and Long, W. T.
Water table fluctuation and depth of rooting of citrus trees in the Indian River area.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 24-9, bibl. 4.

Fluctuations in water table level were followed over a 5-year period by means of open wells in a mature citrus grove on fine sand. The level varied between 1·4 feet and 5·8 feet below the soil surface. Depth of rooting was shallow and was dependent on the water table. The correlation coefficient between the depth of the water table from August 8 to October 24, 1953, and depth to include 75% of all the roots found was 0·777. Yield of trees did not appear to be affected if the peak water table was more than 1·5 feet below the surface.—Fla Citrus Exp. Stat. Lake Alfred.

3064. Crescimanno, F. G., Sacco, S., and Carruba, E.
Ricerche sulla forzatura del limone. **(Investigations on forcing lemons.)** [English and French summaries 17 lines each.]
Riv. Ortoflorofruttic. ital., 1956, **40**: 66-81, bibl. 21, illus.

The Sicilian technique of forcing lemons consists essentially of stopping irrigation at the beginning of July for a period long enough to cause considerable wilting of the leaves and applying abundant fertilizer, mainly quick-acting N, before resuming irrigation. Good results depend on the fertilization and the timing of the resumption of irrigation. The chemical composition and physical properties of forced Femminello lemons harvested fortnightly between early May and mid-August 1955 were determined, the factors investigated including total acidity, reducing sugars, vitamin C, pH and electric potential. The electric potential was found to be correlated with the moisture content of the fruit and hence with that of the tree. It is concluded that it could be used to indicate when irrigation should be resumed.—Ist. Colt. arb. Univ. Palermo.

3065. Romand, J.
Une orientation nouvelle de la culture des agrumes au Maroc. **(A new technique in citrus growing in Morocco.)**
Fruits et Prim., 1955, **25**: 495-9, illus.

The control of water supply and hence of sap flow is discussed in relation to: (1) irrigation, which should be reduced during fruit set and increased in August/September, (2) the moisture-retaining capacity of the

soil, (3) the root systems, and (4) pruning to direct the sap to fruiting branches. The methods outlined can result in yield increases of 30–50% in the first year and of nearly 100% in the second. The maintenance of regular bearing is also discussed in relation to manuring, the cutting-out of diseased wound tissues and the control of diseases and pests.

3066. Harding, R. B., Miller, M. P., and Fireman, M.
Sodium and chloride absorption by citrus leaves from sprinkler-applied water.
Calif. Citrogr., 1956, **41**: 166, 176-9, bibl. 6, illus.
Sodium and chloride absorption by leaves.
Citrus Leaves, 1956, **36**(4): 6-8, 33, bibl. 6, illus.

Citrus leaves wetted by sprinkler-applied water may absorb Na and Cl in sufficient quantities to cause severe leaf burn and even defoliation. No evidence has been found of salt translocation from the lower sprinkled leaves to the upper unsprinkled leaves of the tree. In all cases of damage the waters used were moderately saline.

3067. Morita, Y., Itakura, T., and Yanadori, S.
Effects of soil temperature in winter on growth of seedlings of some citrus root-stocks. [Japanese, with English summary ¼ p.]
J. hort. Ass. Japan, 1956, **24**: 222-6, bibl. 4, illus.

The growth of pot seedlings of sour orange, trifoliate orange and *Citrus junos* (Yuzu) was studied at different soil temperatures in winter. The results were: (1) In the evergreen sour orange both early and late growth were much greater at high than at low temperatures. (2) The fresh weight of the sour orange seedlings was significantly greater at high temperatures, but with the trifoliate orange there was no significant difference. (3) There were no significant differences between treatments in the N, P or K concentrations of the shoots or roots.

Citrus—fruiting control.

3068. Babenko, V. I.
Flower bud initiation and differentiation in the lemon plant under enclosed conditions in the south of the Ukrainian SSR. [Russian.]
Doklady Akad. Nauk. S.S.S.R., 1956, **106**: 559-61, bibl. 1.

Results of observations made on the temperature and light requirements of lemons for flower bud initiation and differentiation show that under the specific ecological conditions of citrus houses and trenches the processes can take place normally. The limited light provided during the winter has no direct effect on bud initiation and by the time the critical temperature for initiation of 9–10° C. is reached in the spring the covering mats are removed and full light is available. Bud initiation in the summer is normally of limited importance, but it was noted that differentiation proceeds more rapidly at the higher summer temperatures (12–14 days at 23–29° C.) than in the spring (14–22 days at 10–18° C.) or autumn (14–18 days at 11–21° C.). The time required in the summer from bud initiation to pistil formation is fairly constant at 15–17 days.

3069. Serafimov, S. S.
Fruiting of citrus seedlings at an early age. [Russian.]
Agrobiologija, 1955, No. 2, pp. 83-7, bibl. 8, illus.

Work in Bulgaria is described resulting in one fruit being obtained by cross-pollinating the first flower of an 8-month-old Duncan grapefruit seedling with Meyer lemon pollen and, two months later, grafting the seedling on Eureka lemon and later again on *Poncirus trifoliata*. Successful reciprocal crosses were also obtained and the outstanding characteristics of F_1 generations of both combinations are described.

3070. Klimenko, K. T.
Hastening the fruiting of lemon seedlings. [Russian.]
Agrobiologija, 1955, No. 6, pp. 131-2, illus.

Spraying 4-year-old lemon seedlings, variety Novogruzinskiĭ, with a superphosphate extract induced flowering in 5 out of 5 plants, and spraying with potassium sulphate solution induced flowering in 2 out of 5 plants, whereas none of the controls flowered. Grafting buds from a fruiting Villafranca lemon into the crowns of 3-year-old Meyer lemon seedlings caused the latter to fruit.

3071. Coutan, R.
Compte-rendu d'un essai d'incision annulaire sur orangers Washington. **(Report on a girdling experiment on Washington Navel orange trees.)**
Terre maroc., 1956, **30**: 89.

Eight-year-old Washington Navel trees on sour orange ringed at full blossom gave an average yield of 142 kg. per tree compared with 116 kg. from the controls, and their fruits were slightly larger.—Stat. rég. hort. Aïn-Chaïb.

3072. Blondel, —.
Lutte contre le saisonnement. **(Control of irregular bearing.)**
Rapp. Cons. Exp. Rech. agron. Algér. 1954, 1955, p. 183.

In 1948 3 irregular-bearing mandarins were top-worked on 3 regular-bearing mandarins and *vice versa*. After 4 years' harvests it had become evident that clonal influence exceeds climatic influence, the coefficients of variation of the regular bearers before and after top-working being 41 and 82% respectively and those of the irregular bearers 74 and 40% respectively.

3073. Butcher, F. G.
Honey bees as pollinators of Minneola tangelos.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 313, bibl. 2.

Honey bees had a beneficial effect on fruit set of 4-year-old Minneola tangelos. The effect was most marked at a distance of 200 to 300 feet from the hives. —Univ. Miami, Coral Gables.

3074. Nauriyal, J. P.
A study of pre-mature fruit drop in citrus.
Indian J. Hort., 1955, **12**: 39-52, bibl. 14, illus.

A study of premature fruit drop was conducted during 1950–52 on orange, mandarin, grapefruit and pummelo, the dropped fruits being classified as sound, split, diseased or insect-damaged. The chief results and conclusions were: (1) Drop was not high in sweet orange and grapefruit. (2) Drop was severe in pummelo and mandarin, occurring chiefly in August/September and being largely associated with fruit splitting, which was particularly prevalent under heavy rainfall conditions. (3) Large Red Flesh No. 2 pummelo and Hill mandarin were the varieties most subject to drop and splitting.—Hort. Res. Stat., Saharanpur.

3075. Hield, H. Z., Riehl, L. A., and DeWolfe, T. A.
Isopropyl 2,4-D again available as growth regulator (for citrus).
Calif. Citrogr., 1956, **41**: 260-2.
Citrus Leaves, 1956, **36**(5): 10-11.

Several cases of damage to young citrus trees and also to a crop of mature trees occurred in 1955 when low volatile esters of 2,4-D were applied. Sprays of isopropyl esters of 2,4-D and 2,4,5-T have therefore again been made available, but only as growth regulators for citrus. In a comparative trial low volatile esters of 2,4-D caused more leaf damage and roughness of fruit rind than did materials classed as high volatile esters.

3076. Blondel, —.
Action sur la fructification. **(Effect [of growth substances] on [mandarin] fruiting.)**
Rapp. Cons. Exp. Rech. agron. Algér. 1954, 1955, pp. 210-15.

Fruit size: Experiments suggest that 2,4-D and especially 2,4,5-T increase fruit size. *Control of premature drop:* In experiments on the control of premature drop just before maturity, which occurs at the end of December and beginning of January, mandarin trees were sprayed twice in December with 10 p.p.m. of either Na 2,4-D or NAA. The 2,4-D reduced drop by 39% compared with the control and the NAA by 22%.

3077. Eteneau, J., and Praloran, J.-C.
L'effet de pulvérisation d'acide 2,4-D sur la chute hivernale des pomelos "Marsh Seedless". **(Effect of 2,4-D sprays on winter drop of Marsh Seedless grapefruit.)**
Fruits et Prim., 1956, **26**: 29-39, bibl. 8.

In experiments on Marsh Seedless grapefruit trees in Morocco 8 p.p.m. 2,4-D was applied in late November, 1954, at 8 l. per tree in the forms of the triethanolamine salt, with or without added chelate, the Na salt with added chelate and an ester. Counts on 6 May, 1955, showed that the triethanolamine salt plus chelate and the Na salt plus chelate had reduced total fruit drop by 21 and 45%, respectively, compared with the controls and the drop of healthy fruit by 34 and 51%, respectively. The Na salt plus chelate slightly (but not significantly) reduced drop of rotten fruit. The other 2 treatments had no significant effects. The purpose of the chelate was to soften the water. [See also *H.A.*, 24: 4211.]

Citrus—air pollution, diseases and pests.

(*See also* 2641, 3119c, f, n.)

3078. Wander, I. W., and McBride, J. J., Jr.
A chlorosis produced by fluorine on citrus in Florida.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 23-4, bibl. 3, illus.

Chlorosis of citrus leaves was observed after the manufacture of triple-superphosphate had been started in the neighbourhood. The affected leaves were analysed for their F content, but no clear relation was found between F levels and chlorosis. Chlorosis patterns identical to those observed were induced by sprays of hydrofluoric and fluosilicic acids, but not by phosphoric acid sprays.—Fla Citrus Exp. Stat., Lake Alfred.

3079. Calavan, E. C.
Seed perpetuation of lignocortosis (wood pocket) of semidense Lisbon lemon.
From abstr. in *Phytopathology*, 1956, **46**: 8.

All known symptoms of lignocortosis, except fruit striping, appeared in seedlings from diseased semidense Lisbon lemons. The erratic occurrence of leaf, root, and shoot patterns and of necrotic streaks and sectors in the bark, wood, and fruit peel of diseased trees, together with the failure of diseased tissue grafts to produce symptoms in healthy trees or in seedlings therefrom, suggests that an unstable chimaera is responsible for the disorder.

3080. van der Plank, J. E.
Plant pathology. [Forming part of the Annual Report of the Secretary for Agriculture, Union of South Africa, for the year ended 31 August, 1955.]
Fmg S. Afr., 1956, **31**: 94-5.

Work reported includes research on qualitative differences in virus content between different species of citrus. The seedling yellows virus component failed to become systemic in young grapefruit trees systemically infected by grafting before planting out in the orchard. A variable percentage of grapefruit seedlings in the glasshouse, however, did become systemically infected after inoculation by aphids. The possible mechanism of field immunity is discussed.

3081. Childs, J. F. L., and others.
The incidence of xyloporosis (cachexia) in certain Florida citrus varieties.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 77-82, bibl. 12, illus.

In budding tests xyloporosis virus was found in 30 varieties of citrus not previously known to harbour the disease. Bud union symptoms suggestive of xyloporosis have been found in a high percentage of sweet orange trees on rough lemon stock, but not in grapefruit on rough lemon nor in sweet orange or grapefruit on sour orange.—Agric. Res. Serv., U.S.D.A., Orlando.

3082. Childs, J. F. L.
Transmission experiments and xyloporosis-cachexia relations in Florida.
Plant Dis. Reptr, 1956, **40**: 143-5, bibl. 9.

Investigations were made on the transmission by budding and by seed of cachexia of the Orlando tangelo and xyloporosis of sweet lime, diseases which the author considers to be caused by the same virus or strains of

the same virus. The results and conclusions were: (1) The difference between Orlando tangelo and sweet lime in symptom expression may be a matter of differences in host response, since buds from trees on xyloporosis-affected sweet lime rootstocks in Florida gave rise to typical cachexia symptoms when propagated on Orlando tangelo seedlings, and typical xyloporosis symptoms were induced in Palestine sweet lime rootstocks, when they were budded with buds from cachexia-affected Orlando tangelo trees. (2) Transmission of cachexia through Orlando tangelo seed rarely, if ever, occurs, but in preliminary experiments xyloporosis was apparently transmitted through 66% of 30 sweet lime seeds. (3) The possibility of seed transmission of xyloporosis is of prime importance to the citrus budwood certification programme in Florida. (4) Xyloporosis or cachexia cannot be controlled solely through propagating buds free of the virus, if seedlings used as rootstocks carry the causal agent of the disease, and the assumption that citrus nucellar seedlings are *a priori* disease-free may be questioned in the light of the experiments reported.—Hort. Crops Res. Branch, U.S. Dep. Agric., Orlando, Fla.

3083. Klotz, L. J., Calavan, E. C., and DeWolfe, T. A.
Leaf drop and copper spray damage to citrus.
Citrus Leaves, 1956, **36**(3): 6-7, 26, illus.
Calif. Citrogr., 1956, **41**: 167-8, 188-9, illus.

Defoliation of citrus trees has recently occurred sporadically in California, and is thought to have been aggravated by the use of copper sprays. Environment is important in causing the release of soluble copper, and dull, overcast weather and possibly the incidence of a smog blanket may be the chief contributory factors. Copper formulations which have proved relatively safe are recommended for brown rot control in areas subject to damage.

3084. Martin, J. P., and others.
Influence of some common soil fungi on growth of citrus seedlings.
Soil Sci., 1956, **81**: 259-67, bibl. 14, illus.

A greenhouse study was made on the influence of common soil fungi separately and in various combinations on the growth of sweet orange seedlings in a sandy loam and in a clay loam. It was apparent that the fungus population of the soil could vary widely without significantly affecting citrus seedling growth, and most species tested had little or no effect. In this experiment, however, *Thielaviopsis basicola* greatly reduced growth in both soils, but this reduction was sometimes lessened by the presence of other fungi. *T. basicola* caused strong iron-chlorosis leaf patterns on citrus seedlings in silty clay loam without changing the total Fe content of the leaves.—Univ. Calif. Citrus Exp. Stat., Riverside.

3085. DeWolfe, T. A., Klotz, L. J., and Hashimoto, S.
Nematophagus fungi in citrus orchards.
From abstr. in *Phytopathology*, 1955, **45**: 693.

Nematophagous fungi were found during an investigation of the flora of a wood shavings mulch in a citrus grove watered by sprinklers. A great increase in the growth and fruit production of the trees followed the establishment of the mulch-sprinkler practice. An explanation of this improvement is suggested.

3086. Grunberg, A., Polac'ek, K., and Peleg, J.
Fumigation trials with ethylene dibromide for the control of eggs and larvae of *Ceratitis capitata* (Wied.) in citrus fruit.
Bull. ent. Res., 1956, **46**: 803-11, bibl. 5.

In fumigation experiments with ethylene dibromide Jaffa and Valencia oranges were found to tolerate a concentration of 18 g./cu. m. at ±20° C., given for 2½ hours. At the same temperature grapefruit tolerated a concentration of 15 g./cu. m. for 2½ hours, but at an exposure of 6 hours the maximum tolerance was 8 g./cu. m. A 75% kill of *Ceratitis* larvae inside the fruits was obtained by exposure for 2½ hours to a concentration of 15 g./cu. m. Fumigation with Decco (nitrogen trichloride) for fungus diseases was compatible with ethylene dibromide fumigation, and combined fumigation for 6 hours at 6 g./cu. m. of ethylene dibromide gave a kill of 93·5–96·4%. The fumigation of fruit for export with 6 g./cu. m. ethylene dibromide killed up to 98·5% of *Ceratitis* larvae. This concentration did not injure Jaffa or Valencia oranges but slight damage did occur to grapefruit, especially when over-ripe.—Minist. Agric., Div. Plant Prot., Jaffa.

3087. Gellatley, J. G.
Fruit fly. Ethylene dibromide fumigation as sterilisation process for export citrus.
Citrus News, 1956, **32**: 10.

Fruit fumigation after picking, but before packing, in a gas-tight chamber with ethylene dibromide has been tested in New South Wales. At least double the recommended American dosage was required against Queensland fruit fly, and at these levels there is a risk of some skin injury. Commercial recommendations cannot yet be made.

3088. Johnson, R. B., and Thompson, W. L.
Progress report on research with miticides.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 94-9, bibl. 12.

Adults of purple mite (*Metatetranychus citri*) on heavily infested citrus trees were controlled by Aramite or DN dry mix, though no ovicidal effect was apparent. EPN-300 was found to be equal to Aramite, DN dry mix and Ovex in controlling purple mite, and may be worthy of limited commercial use. Insufficient data have been collected on the behaviour of Systox under Florida conditions to justify recommending it.—Fla Citrus Exp. Stat., Lake Alfred.

3089. Latif, A., and Khan, J. A.
Control of citrus psylla with diazinon emulsion.
Punjab Fruit J., 1955, **19**: 42-3.

A 0·02% diazinon emulsion resulted in 100% knockdown of citrus psylla (*Diaphorina citri*) in 3½ hours in laboratory tests, and in 4 hours on adults on Malta orange plants. On lemons the same rate gave 100% mortality of adults and nymphs. No phytotoxic affects were observed.—Punjab agric. Coll., Lyallpur.

3090. Johnston, C. J. R.
Mildura report. Various insecticide formulations compared with fumigation in Red Cliffs tests, 1948-55.
Citrus News, 1955, **31**: 166-7.

Control of red and yellow scale of citrus has been further studied and results obtained are tabulated with comments. Two sprays of 0·05% E605 applied in November and January gave promising control. Highly satisfactory control was obtained by parathion wettable powder sprays. Satisfactory control was obtained by 2 applications of 1 : 40 white oil. Fumigation with HCN or cyanogas in January did not control scale satisfactorily, but much better results were obtained when followed 2 months later by a white oil spray. Nylon as a fumigation tree cover was equal to 10 oz. cotton duck. No damage was caused by the oils used, but analysis of fruit from oil-sprayed trees showed it to be inferior to that from parathion-sprayed trees. The replacement of one parathion spray by an oil spray reduced infestation below that for 1 parathion spray. Population studies in unsprayed orchards showed that scale mortality rose with predator population. Systox, when sprayed, did not give encouraging results, but when painted on the stems it markedly reduced scale. [See also *H.A.*, 25: 2038.]

3091. Johnson, R. B., and McBride, J. J., Jr.
Parathion can be used with lime-sulfur.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 99-103, bibl. 4.

In 3 experiments on Valencia orange trees parathion plus lime-sulphur was as effective as parathion plus wettable sulphur in controlling purple scale (*Phyllocoptruta oleivora*). Parathion residues 1 hour after application were higher for the lime-sulphur combination, but depreciation was faster than with the wettable sulphur mixture.—Fla Citrus Exp. Stat., Lake Alfred

3092. Peterson, G. D., Jr.
Biological control of the orange spiny whitefly in Guam.
J. econ. Ent., 1955, **48**: 681-3, bibl. 1.

The orange spiny whitefly, *Aleurocanthus spiniferus* (Quaint.) was formerly a serious pest of citrus and other plants in Guam. Five species of parasites were introduced from Mexico in 1952. Two of these species, *Prospaltella smithi* and *Amitus hesperidum*, became established. Parasitism by the two species varied from 80 to 95% with *Prospaltella smithi* predominating. Commercial control of the orange spiny whitefly by parasites has been achieved. [Author's summary.]—Dep. Agric., Guam.

3093. Pappas, J. L., and Carman, G. E.
Field screening tests with various materials against the European brown snail on citrus in California.
J. econ. Ent., 1955, **48**: 698-700, bibl. 3.

Of 32 chemicals and mixtures used in baits in field screening tests against the European brown snail, *Helix aspersa*, Isolan appeared to be the most effective. Compound G-34 and Pyrolan were moderately effective. The remaining chemicals and mixtures had little or no toxic effect against snails. Application of the baits to the ground in a peripheral band outside and around the skirts of the trees, and broadcasting of the baits into the trees, were equally effective methods of bait application and were more successful than baiting an annular area on the ground near the trunk. [From authors' summary.]—Univ. Calif., Riverside.

Citrus—fruit composition and storage.

(*See also* 3119s.)

3094. Deszyck, E. J., and Sites, J. W.
Juice content in early Ruby Red grapefruit.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 47-9, bibl. 8.

Young Ruby Red grapefruit trees on sour orange were given post-blossom sprays of lead arsenate, and fruit was collected and analysed throughout the season. Juice content increased with maturity and was not significantly affected by lead arsenate sprays. At the time of passing legal ratios the juice content was generally higher in naturally maturing fruits than in lead arsenate treated fruits. Maturity was delayed by approximately 3 weeks by raising juice standards, and the resultant delay in harvest tended to improve the quality of the grapefruit marketed early in the season. —Fla Citrus Exp. Stat., Lake Alfred.

3095. Rahman, R.-u., and Ali, S.
Studies of the relation of colours in peel and juice and their ascorbic acid in some mandarin varieties of the Punjab.
Punjab Fruit J., 1955, **19**: 30-3, bibl. 18.

The ascorbic acid content of peel and juice of 4 mandarin varieties decreased with the increase of yellow and red pigments and the disappearance of blue pigments. Peel of Feutrell's Early and juice of Mangal Singh had the highest vitamin C contents. The yellow pigments in the juice increased more rapidly than did the red pigments with the advance of the season. Peel of the Kinnow Mandarin and of Coorg varieties became richer in yellow pigments, while in the other varieties the red pigments increased more rapidly.—Punjab agric. Coll., Lyallpur.

3096. Ephraim, A., and Monselise, J. J.
Composition of bitter oranges grown in Israel.
Bull. Res. Coun. Israel, Sect. C, 1955, **5C**: 60-2, bibl. 3.

The specific gravity of small fruits was higher than that of large. In small fruits the peel was 2–4 mm. thick and the juice content was about 32%, whereas in large fruits the peel was 4–6 mm. thick and the juice content was about 30%. A satisfactory indication of fruit maturity was given by peel colour. The total soluble solids and their ratio to acids were higher in mature fruit than in yellow fruit.—Labs ASSIS Ltd., Ramat Gan.

3097. Curl, A. L., and Bailey, G. F.
Orange carotenoids. Part I—Comparison of carotenoids of Valencia orange peel and pulp. Part II—Carotenoids of aged canned Valencia orange juice.
J. agric. Food Chem., 1956, **4**: 156-62, bibl. 8.

A comparison of the peel and pulp of early-season Valencia oranges showed over 60% of the total carotenoids but less free diols and polyols in the peel. Qualitatively the components were almost identical;

quantitatively peel carotenoids contained much more violaxanthin. One constituent not previously found in late-season juices, apparently cryptoxanthin furanoxide, was found in both pulp and peel carotenoids; the corresponding epoxide was present in peel caritenoids. [From authors' summary.]—Agric. Res. Serv., U.S.D.A., Albany, Calif.

3098. Roistacher, C. N., Klotz, L. J., and Eaks, I. L.
Detecting surface injuries to fruit.
Calif. Citrogr., 1956, **41**: 239-42, bibl. 5, illus.
Effective color indicator for detecting surface injuries to citrus fruits.
Citrus Leaves, 1956, **36**(6): 6-7, 22, bibl. 5, illus.

A solution of 2,3,5-triphenyl tetrazolium chloride becomes red in the presence of certain enzymes found in living cells, and is therefore useful for detecting injuries on citrus fruits. The dye revealed significant increases in injuries made during various handling operations. During picking operations injury incidence was increased 4–6 times. There was little or no increase in the number of stainable wounds during hauling and the subsequent standing period.

3099. Minz, G.
Uncooled summer-storage of citrus fruits.
Ktavim, 1956, **4**(2): 15-16.

It was concluded that mature Valencia oranges and grapefruit, and silver-green lemons, taken from young well-cultivated groves can, if wrapped and treated with diphenyl, be kept in uncooled storage for 12 to 16 weeks —i.e. from April to mid-July or the beginning of August. Shamouti oranges, under the same conditions, can be successfully stored for 12 weeks, from March to mid- or late June. [Author's conclusions.]

3100. Newhall, W. F., and Grierson, W.
A low cost, self-polishing, fungicidal water wax for citrus fruit.
Citrus Mag., 1956, **18**(7): 14-17, 32-3, bibl. 12.

A self-polishing, high gloss water wax has been developed which contains sodium *o*-phenylphenate as a fungicide and uses only inexpensive waxes and resins. The gloss has good persistence, and fruit shrinkage and decay are reduced.—Fla Citrus Exp. Stat., Lake Alfred.

Dates.

(*See also* 3208.)

3101. Monciero, —., and Wertheimer, —.
Palmier-dattier. **(Date palm.)**
Rapp. Cons. Exp. Rech. agron. Algér. 1954, 1955, pp. 166-70.

Establishment of suckers in the plantation: Suckers of 20–22 kg. show the highest establishment rate, but in practice a size range of 16–25 kg. is satisfactory. Fungicidal dips are being tested as means of checking invasion by pathogens through the wound at the point of removal from the parent palm. *Pollination:* Experiments confirmed previous conclusions that when the temperature sum counting from 1 January reaches 1,100° C. the viability of almost all pollen from normal plants exceeds 50%. It was concluded that: (1) When the temperature sum has not reached this figure the amount of pollen applied should be increased and more care taken in applying it; (2) a weekly pollination round is sufficient; and (3) growers should only retain male palms with high yields and good pollen germination rates. Mechanical pollination experiments are reported. *Bunch pruning:* Three years' experiments have shown that removal of one-third of each bunch considerably improves the quality, homogeneity, earliness and mean weight of the fruit of healthy palms but gives only moderate or negative results with low-yielding palms. In an experiment in 1954 pruning a good plot in May or July increased the proportion of 1st and 2nd quality fruit compared with the controls, and the May treatment gave the greater total weight of fruit sold, profit and average weight of fruit.

3102. Lefèvre, F.
La lutte contre les termites à la Station I.F.A.C. du palmier-dattier de Kankossa (Mauritanie). **(Termite control at the I.F.A.C. date palm Station at Kankossa, Mauritania.)**
Fruits d'Outre Mer, 1956, **11**: 47-50.

Five per cent BHC (25% active principle) was applied to 2,850 date palms with a watering can at 1 l. per palm in July during the rainy season. In November the number of infested trees had fallen from 637 to 210, but the infested trees were in general not the same as those formerly infested. Many plots were free or almost free of infestation, which was concentrated in one peripheral area, suggesting invasion from outside. The total cost was 8·05 fr. per palm.

3103. Rahman, R.-u., and Ali, S.
Relative amounts of sugars and their relation to the flesh portion in some date varieties of the Punjab.
Punjab Fruit J., 1955, **19**: 26-9, bibl. 12.

Cured dates of 6 important date varieties grown in the Muzaffargarh district were analysed. Moisture content varied from 11·5–19·0%. The flesh formed 84·3–91·6% of the total bulk. Total sugar content varied from 74·08 to 85·2% on a dry weight basis. Zaidi contained the highest percentage of total and reducing sugars. Glucose varied from 31·16–36·4% and fructose from 31·0–45·78%; Hillawi was richest in glucose and Zaidi in fructose.—Punjab agric. Coll., Lyallpur.

Litchis.

(*See also* 3120.)

3104. Nanz, R. A.
Soil pH variations and lychee growth.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 275-6, bibl. 9.

In an orchard survey it was found that most litchi trees grew best in a pH range of 5·0–5·5. Reduced growth and yield was observed in more acid soils.—Fla Chem. and Eng. Inc., Orlando.

3105. Nakata, S.
Floral initiation and fruit-set in lychee, with special reference to the effect of sodium naphthaleneacetate.
Bot. Gaz., 1955, **117**: 126-34, bibl. 11, illus.

Blossoming of lychee in Hawaii is favored by dry autumn months followed by substantial rainfall from December to February. Sodium naphthaleneacetate (SNA) promotes blossoming only when there has been heavy rainfall during October and November and with adequate water available from December to February. Under these conditions the nature of the action of SNA appears to be an inhibition of vegetative growth, which in turn is a requisite for floral initiation. SNA application did not result in increased floral initiation and yield during a year with dry fall months and on trees that had yielded heavily during the previous year. [Author's summary.]—Univ. Hawaii agric. Exp. Stat., Honolulu.

3106. Mukerjee, P. K.
Storage of litchi.
Sci. and Cult., 1956, **21**: 603-4, bibl. 2.
Semi-mature fruits placed in polyethylene bags with moist moss kept their colour for 3 weeks at 45° F. and for up to 7 days at room temperature. At 45° F. wastage amounted to 9%. Wastage among ripe fruits similarly stored was very high.

Olives.

(*See also* 3119p, 3208.)

3107. Testa, J., and Marsico, D.
El indice de Bellier en los aceites de oliva argentinos. (**The Bellier index of Argentinian olive oils.**) [English summary 12 lines.]
Rev. Agron. B. Aires, 1952, **13**: 226-38, bibl. 25 [received 1956].
In recent investigations in Argentina the olive varieties which produced the oils with the lowest Bellier indexes —and therefore with desirably low content of solid triglycerides—were Liguria (Bellier index 5·4), Empeltre (7·56) and Arbeguina (8·38). The provinces from which the oils with the lowest average index came were Buenos Aires (7·2), Mendoza (8·55) and Catamarca (8·98).

3108. Elant, H.
L'olivier. Note sur l'application en Algérie et en Tunisie des techniques italiennes d'obtention des oliviers par semis et greffage. (**The olive. A note on the application in Algeria and Tunisia of Italian methods of propagation by grafting on seedlings.**)
Terre maroc., 1956, **30**: 49-53, bibl. 1, illus.
Algerian and Tunisian modifications are described of the Italian method of crown grafting on seedlings in the nursery. Subjects discussed include line sowing on ridges in the field, nursery technique, after-care of grafted plants and varieties. It is recommended that a combination of the Algerian and Tunisian methods, with the addition of the severance of the taproot of 1-year-old stocks at the base of the ridge in winter to stimulate lateral rooting, should be tested against the strict Italian technique in Morocco. [See also *H.A.*, 25: 2081.]

3109. Elant, H.
Note sur l'influence des irrigations sur la composition des olives. (**Effect of irrigation on the composition of olives.**)
Terre maroc., 1956, **30**: 118-29, bibl. 4.
In investigations in the Beni Amir/Beni Moussa irrigation area in 1954/55 olives were intercropped with either winter or summer crops and received up to 12 irrigations in the year. Contrary to a previous report, the oil content of the olives was comparable with that in irrigation areas in other parts of Morocco. Frequent irrigation increased the weight of individual fruits, and the low oil percentage was due not to a reduction in the oil content but to an increase in the moisture content. It is concluded that frequent irrigations increase oil yields per tree and that summer intercrops may also increase production.

3110. Yankovitch, L., and Louvrier, J.
Étude sur l'épuisement des olivettes Sfaxiennes agées. (**A study of soil deterioration in old olive groves in the Sfax region of Tunisia.**)
C.R. Acad. Agric. Fr., 1956, **42**: 222-6, bibl. 3.
Soils, which had supported olive trees for more than 50 years, were analysed. By comparison with uncultivated soils, humus, N and P_2O_5 were markedly lower.

3111. Ciferri, R., and others.
La leptonecrosi da borocarenza dell'olivo. III. (**Olive phloem necrosis due to boron deficiency. III.**) [English summary ¼ p.]
Ann. Sper. agrar., 1956, **10**: 335-56, bibl. 57, illus.
The symptoms of olive leptonecrosis are of 3 types: phloem necrosis accompanied by leaf tip discoloration, defoliation and dieback; witches' brooms; and allophylly. The introduction of 0·5 g. boric acid powder into a 2-cm. deep hole 20–25 cm. above the ground resulted in the disappearance of the symptoms of the 1st type by the autumn of the same year. The B contents of healthy and diseased leaves and of the soil under healthy and diseased trees are given. B treatment increased production and induced regular bearing but did not overcome witches' brooms or certain leaf abnormalities, including sickle leaf. Recommended soil applications of boric acid range from 17·5 g. per young tree to 190·0 g. per mature tree. These should be accompanied by complete fertilizer. [For parts I and II see *H.A.*, 26: 2138 and 2139.]

3112. Hartmann, H. T.
Induction and abscission of olive fruits by maleic hydrazide.
Bot. Gaz., 1955, **117**: 24-8, bibl. 14.
Foliar sprays of maleic hydrazide were applied to olive trees in California during the winter months under conditions of high humidity. A concentration of 1% MH with 0·1% Vatsol O.T. as a wetter caused about 95% of the fruit to drop when the branches were lightly shaken. Some leaf abscission also occurred but was confined to older leaves. Growth was retarded after MH applications, but no visible injury to leaves or stems was noted. After spraying with 1% MH-30 the oil extracted from the fruits was found to contain 0·15 p.p.m. MH.—Univ. Calif., Davis.

3113. Boselli, F.
Risultati della sperimentazione antidacica in Sardegna, nel 1954, con parathion e derivati sintetici clorurati abbinati a poltiglia bordolese. **(Results of olive fly control experiments in Sardinia in 1954 with parathion and chlorinated compounds combined with bordeaux mixture.)** [English summary 9 lines.]
Ann. Sper. agrar., 1956, **10**: 415-20, bibl. 3.
Parathion or dieldrin in various combinations with bordeaux mixture were applied for the control of *Dacus oleae* and leaf spot (*Cycloconium oleaginum*) respectively. Bordeaux mixture at 1% plus 0·03% parathion at 10 l. per tree applied 3 times in September–October gave the best results. The rate of infestation was 67% when the treatment began, but only 10–15% of the total production was lost, whereas surrounding untreated orchards lost 60–70%. Parathion residues in the oil of treated olives were below 1%. Bordeaux mixture at 1% plus 2% dieldrin in early September followed by 2% dieldrin alone in late September and late October gave nearly as good results.—Osserv. Fitopat. Sardegna, Cagliari.

3114. Pellegrini, G.
Armi nuove e potenti per la lotta contro la mosca delle olive. **(New and effective means of controlling the olive fly.)**
Ital. agric., 1955, **92**: 747-54, bibl. 5, illus.
The results are given of laboratory and field experiments in 1953/55 on the control of *Dacus oleae* with the N-monoisopropylamide of 0,0-diethyldithiophosphorylacetic acid and the N-monomethylamide and the N-monoisopropylamide of 0,0-dimethyldithiophosphorylacetic acid. Laboratory tests showed that, compared with parathion at equivalent rates, these 3 compounds were less toxic to mammals but much more toxic to olive fly larvae. In field trials they also caused higher mortality of the larvae than did parathion.—Lab. sper. agrar. Soc. Montecatini, Signa.

3115. Sacantanis, C.-B.
La teigne de l'olivier au Maroc. **(The olive moth in Morocco.)**
[*Publ.*] *Serv. Def. Veg., Rabat* **7**, 1955, pp. 17, bibl. 9, illus.
The biology of *Prays oleellus* is described. The best period for control measures starts when the caterpillars move off the leaves or when they begin hibernation and continues during the pupal stage until the adults emerge. During this period sprays of thiophosphoric esters have given excellent results.

3116. Lozzia, G.
Essais de traitement de la cochenille noire de l'olivier et de la fumagine dans les oliveraies du Maroc Oriental. **(Tests on the control of the olive black scale and sooty mould in East Morocco.)**
Terre maroc., 1956, **30**: 54-7.
In experiments on the control of *Saissetia oleae* in 1953/54 the following treatments were applied at 17 l. per tree in August when hatching was over: (1) white oil plus bordeaux mixture plus micronized sulphur; (2) white oil plus bordeaux mixture; and (3) white oil alone. The results and conclusions were: (1) The scale can be controlled by a single application of 2·5% white oil made as soon as hatching is over. (2) Sooty mould can be removed by a single application of 1% bordeaux mixture with or without the addition of 0·7% wettable micronized sulphur but the latter may cause leaf burn in hot weather. (3) Yields with the various treatments were 41–44 kg. per tree compared with 40 in the control. (4) The treatment paid for itself.

Persimmons.

(*See also* 2377, 2420.)

3117. Baldini, E., and Scaramuzzi, F.
Contributo ad una indagine pomologica sulle cultivar di diospiro. Parte II. **(A contribution to pomological research on persimmon varieties. Part II.)** [English summary 5 lines.]
Ann. Sper. agrar., 1956, Vol. **10**, No. 2, Suppl. pp. i–xx, bibl. 121, illus.
Notes are given on a further 5 varieties of *Diospyros kaki* and on the chief botanical and pomological characters of *D. lotus*, *D. virginiana* and its variety Ruby recently introduced from the United States. [For part I see *H.A.*, 26: 2144.]

3118. Sato, K., Ishihara, M., and Harada, R.
The amounts of nutrient elements absorbed by Japanese persimmon trees. II. [Japanese with English summary ½ p.]
J. hort. Ass. Japan, 1956, **24**: 217-21, bibl. 1.
The average amounts of N, P_2O_5 and K_2O absorbed in a year by 25-year-old Japanese persimmons spaced at 18 trees per tan (0·25 acre) and yielding 1,695 kg. fruit per tan were 9·96, 2·36 and 9·24 kg. respectively. Comparable figures are also given for 9-year-old trees.

Noted.

3119.

a Bitters, W. P., Batchelor, L. D., and Foote, F. J.
Valencia orange strains.
Calif. Citrogr., 1956, **41**: 277-9, 283-4, illus.
Experimental Valencia orange strain plantings.
Citrus Leaves, 1956, **36**(5): 6-8, 24, illus.
Notes on 12 strains established in 2 trials.

b Brogdon, J. E.
Insects and mites of mangos and avocados.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 278-82, bibl. 3.
Species and control in Florida.

c Costantino, G.
Gli insetti dannosi agli agrumi. **(The insect pests of citrus.)**
Inf. fitopat., 1956, **6**: 34-9, 74-9, illus.
In Italy and their control.

d David, V.
Les agrumes dans la région de Meknès. **(Citrus in the Meknès district.)**
Fruits et Prim., 1956, **26**: 3-22, illus.
Area, varieties, cultural practices in Morocco.

e Di Martino, E.
L'impiego degli insetticidi di sintesi in agrumicoltura e loro influenza sulla fauna entomofaga. **(Synthetic insecticides: their use in citrus growing and their effect on the entomophagous fauna.)**
Riv. Agrumic., 1956, **1**: 163-7.
DDT and phosphoric esters.

f Feder, W. A., and Feldmesser, J.
Root abnormalities caused by burrowing nematode infections.
From abstr. in *Phytopathology*, 1956, **46**: 11.
Symptoms on grapefruit caused by *Radopholus similis*.

g Guseva, E. I.
Biological principles of pruning citrus to obtain high and regular yields. [Russian.]
Kraevoe Gosud. Izdat., Krasnodar, 1951, pp. 120, bibl. 33, illus.
A general survey of Russian methods.

h Harding, R. B.
Physical condition of citrus soils.
Calif. Citrogr., 1956, **41**: 220.
Compaction apt to occur in areas between rows.

i Hu, C.-C.
Citrus studies in China. I.
J. agric. Ass. China, 1955, **12**: 55-9.
Citrus species and varieties, indigenous and exotic.

j Macfie, G. B., Jr., and Stahl, A. L.
Utilization of cull avocados.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 136-8.
Preservation by quick-freezing.

k MacMahon, J. W.
Lemon growing in Tasmania.
Tasm. J. Agric., 1955, **26**: 347-8.

l Mamporija, F. D.
Vegetative hybridization of citrus fruits. [Russian.]
Agrobiologija, 1955, No. 4, pp. 193-9, illus.
Work at Suhumi and discussion of the subject.

m Martin, J. P.
Biological status of citrus soils.
Calif. Citrogr., 1956, **41**: 233-4.
Knowledge on pathogens, nematodes and fumigation effects reviewed.

n Moore, P., Skou, S., and Nauer, E.
The gopher menace.
Calif. Citrogr., 1956, **41**: 273-5, bibl. 1, illus.
Damage to citrus worse than suspected [see also *H.A.*, 25: 3200].

o Mouat, H. M.
What is the future of the naranjilla in New Zealand?
Orchard. N.Z., 1956, **29**(2): 2-3, bibl. 3, illus.
Solanum quitoense recently introduced for trial.

p Raymond, W. D., and Ward, J. B.
Olive oil from Cyprus.
Colon. Plant Anim. Prod., 1955 (issued 1956), **5**: 162-5.
Report on sample.

q Ruggieri, G., and Di Prima, S.
Il fattore temperatura in agrumicoltura e raffronti fra le condizioni della California e quelle della Sicilia. **(The temperature factor in citrus growing and a comparison of the conditions in California and Sicily.)**
Riv. Agrumic., 1956, **1**: 175-8.

r Tašmatov, L. T.
Chinese date—a valuable fruit crop. [Russian.]
Sad i Ogorod, 1956, No. 3, pp. 63-4, illus.
Notes on *Zizyphus sativa*.

s Ting, S. V.
Rapid colorimetric methods for simultaneous determination of total reducing sugars and fructose in citrus juices.
J. agric. Food Chem., 1956, **4**: 263-6, bibl. 12.

TROPICAL FRUIT AND PLANTATION CROPS.

General.

(*See also* 2503f, 2504k, 3191o, p, 3192m, 3196.)

3120. Mustard, M. J.
Handling guavas, lychees and white sapotes for the fresh fruit market.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 267-70, illus.
Procedures based on the results of investigations by the University of Miami are outlined. Guavas and white sapotes (*Casimiroa edulis*) are picked in the hard ripe stage, and are graded and sized. A layer of wrapped fruit is packed in a ventilated lug box with padding to avoid damage in transit. The boxes are shipped in refrigerated trucks (45–55° F.). Litchis are picked when they are bright red, and after sorting are packed in a ventilated lug box with a cushion of shredded paper. Transport from Florida has been by air.—Univ. Miami, Coral Gables.

3121. Moutia, L. A.
The commoner insect pests of orchards, food crops, vegetables, flower gardens and household in Mauritius.
Bull. Dep. Agric. Mauritius **91**, 3rd edition, revised 1955, pp. 79, illus., Rs. 2.00.
This bulletin has been considerably enlarged since the first edition [see *H.A.*, 5: 607] and has many useful photographs. There are indexes of English names of plants with their pests, vernacular names of plants with English and Latin names, and scientific names of pests with hosts.

3122. Muthu, M., and Pingale, S. V.
Control of fruit fly infestations in fresh fruit.
Indian J. Hort., 1955, **12**: 117-21, bibl. 11, illus.

Treatment with 1 lb. ethylene dibromide per 1,000 cu. ft. for 6 hours or ½ lb. for 12 hours in a sealed earthenware pot resulted in 100% mortality of the eggs and larvae of *Dacus* spp. in guavas, mangoes, cucumbers, snake gourds and bitter gourds and of *Carpomyia vesuviana* in *Zizyphus jujuba*.—Centr. Food tech. Res. Inst., Mysore.

3123. Vilardebo, A.
Essais de lutte contre *Zonocerus variegatus* dans les cultures fruitières. (**Control of *Zonocerus variegatus* in fruit crops.**)
Fruits d'Outre Mer, 1956, **11**: 107-10, bibl. 2.

Experiments in 1954/55 confirmed the difficulty of applying insecticides by fogging in a hot country. The technique was temporarily replaced by atomising which gave good results with either an oil or a water base. The oil base is more economical in insecticide and gives a better cover than the water base but can burn leaves and young shoots. The recommended lindane rates per ha. against (a) hatching larvae and (b) adults and large larvae are 150 g. and 1·4 kg. respectively with a water base and 95 g. and 1·2 kg. respectively with an oil base.—I.F.A.C. [For earlier work see *H.A.*, 24: 1919 and 25: 991.]

Bananas.

(*See also* 2346, 3191c, 3192q, 3217.)

3124. Jain, N. L., Lal, G., and Subrahmanyan, V.
A quick field method for the estimation of starch in banana pseudostem.
J. Sci. Food Agric., 1956, **7**: 61-5, bibl. 14.

The material is treated with aqueous sodium hydroxide in the cold to dissolve the starch, and the time of flow of a definite volume of the resultant solution through a capillary is determined and the starch content calculated by reference to a standard curve. [From authors' summary.]—Centr. Food tech. Res. Inst., Mysore.

3125. Sequeira, L.
Studies on the dissemination and control of the moko disease of bananas.
From abstr. in *Phytopathology*, 1956, **46**: 25-6.

In experimental plots disinfection of pruning tools and the elimination of infected stools reduced the increase in the total number of cases of moko disease (*Pseudomonas solanacearum*) from 10·0 to 0·3% during a 6-month period. Treatment of the sites of infected plants with D-D, formaldehyde or urea did not permit replanting without a fallow period. When infested abandoned land was ploughed several times during the dry season and then replanted, there was a very low incidence of disease 10 months after replanting, indicating that the primary requirement for the elimination of the bacterium from soil is a lowering of the moisture content.

3126. Waite, B. H.
Fusarium stalk rot of bananas in Central America.
Plant Dis. Reptr, 1956, **40**: 309-11, bibl. 4, illus.

The symptoms of fusarium stalk rot (*F. moniliforme*) of bananas in Central America are described. The disease is prevalent in young plantings, in wind-damaged plants, in severely pruned stools and in newly planted areas intentionally flood-fallowed previously for the eradication of the Panama disease *Fusarium*. It seldom becomes a problem in commercial plantations when diseased stalks are removed during regular pruning cycles.—United Fruit Co., La Lima, Honduras.

3127. Tsalpatouros, A.
La banane chez le mûrisseur. I. II. (**The banana in the ripening chamber. I and II.**)
Fruits d'Outre Mer, 1956, **11**: 59-74, bibl. in text, illus., and 120-6.

In the first article, the role of temperature in banana ripening is discussed and recommendations are made on the arrangement of stems in ripening chambers in France. The second is concerned with the role of water, including moisture conditions in the banana and in the surrounding air and their interaction.

3128. Chiang, M. N.
The effect of acetylene on the ripening of bananas. [In English, with Chinese summary.]
Mem. Coll. Agric. nat. Taiwan Univ., 1955, **4**(1): 47-70, bibl. 18.

In experiments in 1954/55 the ripening of three-quarters ripe bananas (*Musa sapientum*) was successfully advanced at 70° F. by 2–3 treatments with 2 cu. ft. acetylene per 1,000 cu. ft., each lasting 11–12 hours and separated by intervals of up to 12 hours. Green tip, the stage before table ripeness, was reached about 5 days after treatment began. The treatment can be applied to bananas chilled in transit or of inferior quality. The reduction of weight losses during ripening by the rapid removal of vital heat is also discussed.

Cacao.

(*See also* 2363, 3191w, 3215.)

3129. Fowler, R. L., Desrosiers, R., and Hopp, H.
Evaluation of certain factors affecting the yield of cacao in Ecuador.
Ecology, 1956, **37**: 75-81, bibl. 8.

Some environmental and pathological factors affecting yields of cacao in Ecuador have been studied. Correlation coefficients indicated a rather complicated interrelationship between rainfall, witches' broom disease (*Marasmius perniciosus*) and pod rot caused by *Monilia roreri*. A highly significant negative correlation existed between yield and rainfall, and a significant correlation between yield and witches' broom. There was a significant correlation between witches' broom and rainfall. A highly significant negative correlation was also found between yield and area of plantation. No correlation was apparent between yield and incidence of *Monilia* pod rot, although the pod rot showed a highly significant correlation with witches' broom.—Agric. Div., U.S. Operations Mission to Ecuador.

3130. KADEN, O. F.
Lager- und Reiseschäden von Rohkakao in den Tropen und ihre Verhütung. **(Damage to raw cacao during storage and transport and its prevention.)** [French and Spanish summaries ¼ p. each.]
Gordian, 1955, **55**(1318): 13-16.

Small-scale trials showed that mould formation on raw cacao in ships' holds due to sweating can be satisfactorily controlled by reducing the moisture content of the beans before loading and by drying the air in the hold with silica gel. It is suggested that the adoption of similar measures would also cut losses during the shipment of coffee.

Coconuts.

(*See also* 3191 l.)

3131. JOHN, C. M.
Coconut cultivation.
Indian Central Coconut Committee, Ernakulam, 3rd edition, 1955, pp. 46, illus., Re 0–10–0.

This popular booklet, which has been translated into Malayalam, Tamil, Kannada and Telugu, deals concisely with coconut varieties, methods of coconut culture and the control of diseases and pests. The latest edition [for 2nd edition see *H.A.*, 23: 3536] contains additional information on green manure crops and pests, and the appendix on the preparation of fungicides and insecticides has been revised. The text is supported by many photographs, the intrinsic merit of which is, however, largely lost in their poor reproduction.

3132. ANON.
Wilting of coconut seedlings.
Bull. Indian centr. Coconut Cttee, 1956, **9**: 162, illus.

In 5 years' experiments at Pattukottai, Madras, 10 days' storage in baskets in the shade had no adverse effect on the establishment of seedlings 9–15 months old. Seedlings stored for 20 days took longer to become established and 1 in 10 died.

3133. SCHOLANDER, P. F.
Hydrostatic pressure in coconuts.
Plant Physiol., 1955, **30**: 560-1, bibl. 4, illus.

Young nuts from the same inflorescence had similar pressures, whether measured *in situ* or freshly detached. In young green nuts the hydrostatic pressure increased with decreasing size. Nuts of all sizes taken from tall palms 10 and 13 m. high had higher pressures than nuts from shorter palms 2–4 m. high. Ripe nuts contained a gas phase. The freezing point of coconut milk was between −0·55° and −0·68° C., with an average osmotic potential of 7 atmospheres. The specific gravity of the coconut milk varied between 1·015 and 1·030, with the lowest values in the sap, which was under the highest pressure. There was an inverse relationship between the size of nut cavity and internal pressure. It is concluded that there must be some active "secretory" process capable of regulating the pressure in the coconut against an osmotic gradient of several atmospheres.

3134. BULL. R. A.
Bronze leaf wilt of coconut palms in Nigeria.
J. W. Afr. Inst. Oil Palm Res., 1955, No. 3, pp. 70-2, bibl. 4, illus.

The symptoms of coconut bronze leaf wilt disease as observed in eastern Nigeria are described. It is suggested that the disease may be due to a deficiency of one or more essential mineral nutrients [see also *H.A.*, 25: 2156].

Coffee.

(*See also* 2723, 3191e, v, 3192a, b, l, n-p, 3219, 3230.)

3135. BÉRCZY, L., AND GUDE, C. J.
Praktijkenquête conugakoffie. **(A survey of conuga coffee growing.)** [English and Indonesian summaries ¼ p. each.]
Bergcultures, 1955, **24**: 557-63.

Replies to a questionnaire show that cultivation costs for conuga (*congensis* × *uganda*) coffee are higher than with robusta, and harvesting continues throughout the year, which also means increased costs. It is concluded that conuga coffee is of very limited value in Indonesia.

3136. MEDCALF, J. C., AND OTHERS.
Experimental programs in Brazil. Coffee horticulture and plant chemistry.
[*Publ.*] *IBEC Res. Inst.*, 1955, pp. 9-30, illus.

Mulches and fertilization: In an experiment on young coffee growing on a sandy soil, the treatments were grass mulching, cover cropping with *Vigna sinensis* or *Calopogonium mucunoides* and clean cultivation, with and without NPK fertilization. Compared with clean cultivation mulching increased production by 58% and cover cropping reduced it by 17%. Chemical fertilizers gave an average increase of 29% with all 3 cultural systems. Grass mulching combined with chemical fertilization reduced soil temperature, increased soil moisture and improved the nutrient status of the trees as determined by foliar analysis. Chemical weed control, which appears to be fully competitive with hand weeding in cost, gave excellent results, especially in combination with mulching. *Irrigation:* In an experiment on 30-year-old coffee growing on sandy loam soil irrigation was carried out (*a*) throughout the year, (*b*) in May/September or (*c*) in September/February, whenever the soil moisture was depleted by 50%. The yield gains or losses with irrigation throughout the year compared with no irrigation were +74% in 1953, −12% in 1954 (a year of heavy early rainfall) and +126% in 1955, the average increase being 49%. Over the 3-year period the increased yields paid for the entire cost of the irrigation equipment and operating expenses and gave a net profit. In another test comparing irrigation with and without mulching, irrigation applied during the 1954 dry season increased the 1955 yield by 104%. *Minor elements:* In a recent experiment Cu, Fe, Mn and Zn salts of EDTA were applied at 28 lb. per acre, either separately or in combination, to the soil at the base of young coffee trees growing on sandy loam. In 1955 the mean cherry yields with Cu, Fe, Mn, Zn and the combination were 1,530, 1,638, 1,236, 1,408 and 1,474 g. per *cova* respectively compared with 560 in the controls. On the average the chelate plots gave 2½ times as much coffee

as the controls. *Foliar analysis as an aid to research and practical production of coffee.* Early results from a co-operative experiment have shown that: (1) Yield and the K content of the leaves are correlated; (2) cover crops compete with the coffee for N, P and K; and (3) grass mulch results in increased P and K absorption.

3137. Drosdoff, M.
Problemas de suelos y nutrición mineral en la producción cafetera de Colombia. (Soil and mineral nutrition problems in coffee production in Columbia.)
Agric. trop. Bogotá, 1956, **12**: 103-5.

The subjects discussed include crespera disease and Mn deficiency. Analysis of the leaves of coffee bushes suffering from crespera, the symptoms of which resemble those of little-leaf of peach, did not reveal a significant deficiency of any nutrient, but suggested a Ca/K unbalance combined with low Zn and B. Affected bushes responded to Ca plus a mixture of minor elements. The symptoms of Mn deficiency, observed at Chinchina, disappeared 3 months after a soil application of manganese sulphate.

3138. Malavolta, E., Arzolla, J. P., and Haag, H. P.
Preliminary note on the absorption of radio-zinc by young coffee plants (*Coffea arabica* L.) grown in nutrient solution. [Spanish summary ½ p.]
Phyton, 1956, **6**: 1-6, bibl. 6.

A 10-fold increase in the levels of Mn, Cu and Mo in the nutrient solution reduced the absorption of radio-zinc by 50% or more compared with the controls. When, however, these micro-nutrients were omitted separately from the solution an increase in uptake of Zn occurred only in the minus-Cu treatments. The level of Fe did not affect the uptake of Zn. When Zn was applied directly to the leaf surfaces, absorption was up to 8 times as great as that from the nutrient solution. Brushing a $Zn^{65}Cl_2$ solution on the lower surface of the leaves resulted in much greater absorption than brushing the upper surface of the leaves, 40% of the activity being absorbed and about 12% translocated to other organs. The results suggest that leaf spraying would be more effective than soil applications in the correction of Zn deficiency in coffee growing under field conditions.—Univ. S. Paulo, Piracicaba, Brazil.

3139. Saccas, A. M.
Recherches expérimentales sur la trachéomycose des caféiers en Oubangui-Chari. (Research on coffee tracheomycosis in Ubangi-Shari.) [English and Spanish summaries ¾ p. each.]
Agron. trop., 1956, **11**: 7-38, bibl. 32, illus.

In Ubangi-Shari tracheomycosis (*Gibberella xylarioides*) occurs in *Coffea excelsa*, *C. neo-arnoldiana*, *C. robusta* and *C. canephora nana*. Experiments and observations over several years have shown that the parasite gains entry through wounds made by man or insects in the trunk, branches and roots. Other experiments have shown that effective control can be maintained by: (1) uprooting and burning infected trees *in situ*, (2) the immediate disinfection of all wounds with a copper fungicide, (3) painting the trunk and branches with a copper/insecticide mixture 3–4 times a year, (4) regular inspection and treatment for root rots, with which tracheomycosis is often associated, and (5) spraying the aerial parts of the tree with a copper/insecticide mixture at least 3 times a year. Copper sulphate injections have a curative effect but are uneconomical and difficult to carry out. Tests have shown that several resistant strains of *C. excelsa* and *C. robusta* exist. Resistant robusta seed has been distributed.—Stat. centr. Boukoko, French Equatorial Africa.

3140. Medcalf, J. C., and others.
Experimental programs in Brazil. Coffee processing investigations.
[*Publ.*] *IBEC Res. Inst.*, 1955, pp. 30-44.

Most Brazilian coffee is strip-picked and before drying it ranges from unripe cherries with a moisture content of 66–70% requiring 80 hours' drying at 40° C. to overmature cherries with a m.c. of 12–25% requiring only 5 hours' drying. Cooperative mechanical drying experiments at the Agronomy Institute, São Paulo, showed that: (1) Temperature governs the drying rate, which is roughly doubled for every 10° increase between 30 and 60° C. (2) On the evidence of these and other experiments the effect of temperature on quality remains obscure. (3) The controlling factor in drying is the diffusion of moisture from the centre of the bean to the surface of the cherry. (4) Mucilage retards drying, mature cherries with a higher mucilage content drying more slowly than green or over-mature cherries. (5) Separation of strip-picked coffee into fractions of equal moisture content would increase drying efficiency and might improve quality; various methods of separation are being tested. Investigations in progress on mechanical drying and sun drying are also reported.

3141. Anon.
Coffee processing in Jamaica.
Commonw. Prod., November 1955, reprinted in *Plant. Chron.*, 1956, **51**: 99-100.

Notes are given on plant and machinery, embodying the latest advances, which have recently been installed in two new pulping stations and a central grading and finishing factory.

Guavas.

(*See also* 3120, 3122, 3191j, z, 3192d.)

3142. Tamburo, S. E., Lynch, S. J., and Nelson, R. O.
Methods of guava top-working.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 321-4, bibl. 9, illus.

Autumn grafting of guavas in 1953 using cleft, veneer and bark grafting methods was unsuccessful. Veneer grafting with greenwood scions worked in the spring resulted in a total "take" of 62·1%; scions wrapped with porolated vinyl film showed 73% "take" and others wrapped with a normal vinyl film 50%. On trees on which cleft grafting and veneer grafting with mature and greenwood scions were combined, 85% of the cleft-grafted scions were alive after 12 weeks. None of the mature scions inserted as veneer grafts survived, but 91·1% of the greenwood scions were alive. Porolated vinyl film again increased the percentage "take".—Univ. Miami, Coral Gables.

3143. BUTCHER, F. G.
Some insect problems on guavas.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 292-3, bibl. 3, illus.
Infestation of young guava fruits by the weevil, *Anthonomus irroratus*, was reduced by a combined spray of BHC and parathion applied in April. Fruit damage by the citron plant bug (*Theognis gonagra*) and the guava fruit worm (*Argyresthia eugeniella* is also described.

Mangoes.

(*See also* 3119b, 3122, 3191f, 3192f.)

3144. YOUNG, T. W.
Influence of temperature on growth of mango pollen.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 308-13, bibl. 1.
Pollen stored at 65–70° F. in a moist atmosphere had not lost its viability after 50 hours. There was no measurable reduction in pollen growth after exposure to 40–50° F.; a slight reduction in pollen germination was observed after exposure to 32–40° F., but pollen tube length was not affected. Fair growth of pollen in the style was made at 75–80° F., but little at 59–61° F. Fresh pollen incubated for 12 hours at 75–80° F. showed normal growth; after 12 hours at 40° F. there was practically no growth.—Sub-trop. Exp. Stat., Homestead.

3145. KENNARD, W. C.
Development of the fruit, seed, and embryo of the Paheri mango.
Bot. Gaz., 1955, **117**: 28-32, bibl. 13, illus.
When growth data from periodic measurements of fruit, seed and embryo were plotted against time, all parts exhibited a sigmoid type of curve. During the 4 weeks following fertilization there was a delay in embryo growth, but 2 weeks later the embryo had completely filled the seed coats. Thereafter growth of embryo and seed coat was rapid until about 12–13 weeks after fertilization, after which it ceased when the husk hardened. Growth of the ovary was initially more rapid than that of the seed, but the seed had completely filled the loculus by about 10 weeks after fertilization. Endocarp lignification started about 10 weeks after fertilization and continued for 3 weeks. The husk, seed and embryo remained constant in size after the husk had hardened, but the fleshy part of the fruit continued to enlarge slowly until maturity.—Fed. Exp. Stat., U.S.D.A., Mayaguez, Puerto Rico.

3146. DAS-GUPTA, S. N., ASTHANA, S. N., AND BHATT, R. S.
Studies on the diseases of *Mangifera indica* Linn. VIII. Occurrence of deposits in necrotic mangoes.
Indian J. agric. Sci., 1955 (issued 1956), **25**: 237-52, bibl. 19, illus.
A detailed histopathological investigation has been made of deposits in necrotic and healthy mangoes, both fresh and preserved, of 10 varieties. Deposits were found in almost all necrotic mangoes. In the early stages they occurred only in the vessels, but at later stages they were present in vessels and ducts and later still in the parenchyma. No deposits were found in healthy mangoes. The use of formalin as a preservative induced deposit formation in healthy mangoes. Deposits generally occurred in tissues well supplied with conducting tissue. Preliminary chemical tests showed that the deposits belong to a group of tannins, phlobatannins or phlobaphenes or their derivatives.—University of Lucknow.

3147. RUEHLE, G. D.
A note on powdery mildew of mango.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 277-8, bibl. 1, illus.
Powdery mildew caused by a species of *Oidium* has seriously damaged the blossom in many Florida mango groves recently. In one grove it appeared that a blossom spray of Karathane WD (at 0·5 lb./100 gal.) gave effective control. In another flowers of severely infected Zill trees, sprayed with Karathane at 0·6 lb./100 gal., did not set fruit, but the trees produced a second crop of less severely-infected flowers which did set.—Sub-trop. Exp. Stat., Homestead.

3148. SINGH, S. M.
Control of mango malformation disease.
Sci. and Cult., 1956, **21**: 532-3, bibl. 1.
In 2 small-scale tests against mites causing malformations on mango shoots and inflorescences [*Tyrophagus castellanii* and *Typhlodromus* sp., see *H.A.*, 25: 4391] the best results were given by 0·04% diazinon in one case and by 0·04% chlorobenzilate in the other, namely 95% uninfested inflorescences compared with 39% in the control in both cases.—Govt. Fruit Res. Stat., Saharanpur.

Oil palms.

(*See also* 3191a.)

3149. W.A.I.F.O.R.
Third Annual Report of the West African Institute for Oil Palm Research 1954-55,
Benin, Nigeria, pp. 152, field maps, 2s. 6d.
Agronomy Division; nursery experiments: In trials at 3 stations on methods of maintaining nurseries for some time on the same site, 50 tons of bunch refuse per acre worked in before planting had a very marked beneficial effect and mulching produced important responses at 2 stations, but dry-season watering gave variable results. In a nursery technique experiment laid down in 1953 early planting (end of April) was significantly better than late (end of May), shading at planting time and in the dry season both slightly improved development, but no significant effect was obtained from watering either at planting time or during the dry season. Several trials showed the superiority of ball-of-earth planting over bare-root planting, but dipping the bare roots in clay slurry before planting also gave fair establishment. In another trial cutting the roots a month before lifting gave better development of ball-planted seedlings than did no cutting, and markedly improved the development of bare-root seedlings. *Agronomy Division: field experiments:* The 1954 records of a number of trials on the treatment of felled bush by burning *vs.* non-burning, the selection of planting material based on vigour, and the establishment and management of young plantations for the most part showed only small

differences between treatments, but in one case the first year's yield figures showed highly significant differences in favour of applying fertilizer in the planting hole and against deep planting. Yields from the spacing-grazing-intercropping experiment showed the same trends as in 1953. In a series of manurial trials responses have mostly been small, although K continues to show significant yield increases in some cases. In one pruning trial severe pruning and the Nnewi method [see *H.A.*, 25: 4395] continued to reduce yields compared with normal practice; in another trial, in an area planted at double density in 1941 and pruned from 1952, the 1953 and 1954 yields suggest that palms have already reacted to improved light conditions by an important increase in bunch weight. *Other Divisions:* The work of the following divisions is also reported in some detail: *Plant Breeding* (breeding, selection, segregation studies, seed selection and trials, fruit form, the Deli palm, pollination, growth and flowering), *Plant Pathology*, *Plant Physiology* (germination studies), *Plant Production*, and *Statistics*.

3150. Toovey, F. W., and Broekmans, A. F. M.
The Deli palm in West Africa.
J. W. Afr. Inst. Oil Palm Res., 1955, No. 3, pp. 9-50, bibl. 17, illus.

A discussion of the origin of the Deli palm is followed by a description of the physiological and morphological characters which distinguish it from the oil palm as known in Africa. Deli seed was introduced into West Africa at various times before the last world war, and the performance of Government and commercial plantings made with it it described so far as information is available. Bunch yields of Deli palms have been very variable. In a trial on 10 Malayan Deli strains and 5 local strains laid down at Main Station, W.A.F.O.R., in 1941 the locals outyielded the Delis by about a third in the 1st 8-year period and their superiority appears to be increasing. In fruit and bunch composition there is little to choose between the two types. The conclusion is reached that the Deli palm is not well adapted to West African conditions, and the further introdution of Deli seed into West Africa for general planting cannot therefore be recommended. There may, however, be certain acclimatized strains, which would be useful for breeding purposes.

3151. Sparnaaij, L. D.
Seedling selection in oil palm nurseries.
J. W. Afr. Inst. Oil Palm Res., 1955, No. 3, pp. 51-63, bibl. 3.

Devuyst's article on nursery selection [see *H.A.*, 24: 928 and 3269n] is critically examined. His chain of correlations is discussed and data from the Institute's experiments are presented for comparison. The conclusion is drawn that the value of a selection method based on size of seedlings in the nursery has not been sufficiently established.

3152. Broeshart, H.
The application of foliar analysis to oil palm cultivation: I. Sampling technique.
Trop. Agriculture Trin., 1956, **33**: 127-33.

When adopting a sampling system, for practical purposes, the morphological position of the leaf sample must be taken into consideration. Leaflets should be taken from corresponding parts of leaves of the same physiological age. The age of palms has an influence on the composition of the leaves. The influence of changes in climatological conditions on leaf composition is not identical for young and old palms. Moreover, the fluctuations in the composition of young palms will be greater than in old palms. Sampling time has a very significant effect on leaf composition; samples taken in the dry season are not comparable with those taken during rainy periods. Sampling during the changes from dry to wet seasons should always be avoided. The errors, involved in the chemical analysis, represent only a small fraction of the total variation. Bulk samples should consist of 20 to 25 palms. [Author's conclusions.]—Res. Dep., Huilever S.A., Belgian Congo.

3153. Bachy, A.
Essai de divers produits anticryptogamiques contre la cercosporiose du palmier à huile.
(Trial of certain fungicides against cercosporiosis of oil palms.)
Oléagineux, 1956, **11**: 231-3, bibl. 4, illus.

Zineb, captan and some copper fungicides were tested against *Cercospora elaeidis* in oil palm nurseries at Sibiti in French Equatorial Africa in 1953. Except for all the copper-containing compounds, which caused severe leaf burn and were stopped, the materials were applied fortnightly from the beginning of the dry season in June to the beginning of the rainy season in mid-October. The best results were obtained with zineb, which gave good control both as a 0·3% spray and as a 10% dust.—I.R.H.O., Sibiti. [See also *H.A.*, 20: 3243.]

Papaws.

(*See also* 3191s, 3192f, g, i.)

3154. Arisumi, T.
Test shipments of papayas, with special reference to storage decay control.
Tech. Bull. Hawaii agric. Exp. Stat. **29**, 1956, pp. 16, bibl. 6.

A major cause of storage losses in papaws shipped to the U.S. from Hawaii is anthracnose decay, which occurs chiefly at the stem end of the fruit. Untreated fruits become susceptible to decay as they start to ripen, and may succumb at all stages of ripeness. Shipment at 44° F. resulted in less storage decay than shipment at 55° F. Decay was reduced by treating papaws with hot water (immersion at 115° or 120° F. for 20 minutes), by short vapour-heat (fruit conditioning at 115° F. and 30–33% R.H. for 3 hours, and then at 115° F. for 2 hours in saturated atmosphere) or by prolonged vapour-heat (conditioning followed by 8¾ hours under saturated conditions at temperatures high enough to maintain a minimum fruit temperature of 110° F.). The hot water treatment was favoured as it takes less time and is less deleterious to fruit quality than vapour heat. *Cercospora* decay of Hilo papaws was not controlled by hot water treatment. In winter, better market quality may be obtained by storing mature green and colour-turning fruits in sealed shipping cartons at room temperature (70-80° F.) for 24 to 36 hours before shipment. [See also *H.A.*, 26: 2222.]

3155. Huet, R.
Nature et propriétés de la papaïne. (**Nature and properties of papain.**)
Fruits d'Outre Mer, 1956, **11**: 51-8, bibl. 44.

The subjects covered include the isolation of papain, its chemical composition, classification, action in general and as affected by pH and temperature, its activators and inhibitors, determination and utilization.

Pineapples.

(*See also* 3191r, 3192c, j, 3217.)

3156. Brimblecombe, A. R.
Pineapple scale investigations.
Qd J. agric. Sci., 1955, **12**: 81-94, bibl. 4, illus.

Studies on seasonal breeding and control of *Diaspis bromeliae* were conducted at Rochedale, near Brisbane. The records suggest that pineapple scale is not of major importance but that occasional severe outbreaks may be serious. Control trials have shown that a mixture of white spraying oil and nicotine sulphate (16–1–640) gave only a small kill of insects and that dispersible BHC (0·1%) and chlordane emulsion (0·5%) were ineffective. Parathion (0·1%) showed some promise. Parasitism by *Aphytis* sp. amounted to a mean of 16·4% of total insects, while predators, mainly ladybirds, accounted for a mean of 22·8%. The effect of oil-nicotine sulphate on parasites and predators was negligible.

Rubber trees.

(*See also* 2724, 3191b, d, g, i, 3192e.)

3157. Sandison, S.
Some notes on the planting of stumps.
Planter, 1956, **32**: 22-5.

Two aids to planting rubber are described. (1) To induce early root development, topping and taproot severance is carried out in the nursery bed 7–8 days before transplanting. (2) In planting, a hole ½ in. longer than the taproot is punched with a crowbar and dry sand is placed in the bottom. The stump, with laterals trimmed to ½ in., is then inserted and the hole is gradually filled alternately with sand and water, ensuring that no air pockets are left.—Rubb. Estates of Malaya, Kota Tinggi, Johore.

3158. Beaufils, E. R.
Considérations physiologiques sur la composition minérale des graines d'hévéa. (**Physiological considerations on the mineral composition of hevea seeds.**)
Oléagineux, 1956, **11**: 379-84, bibl. 10.

Studies made on *Hevea brasiliensis* seeds at the Rubber Research Institute in Indo-China are reviewed. The chief conclusions are: (1) The composition of the soil and the origin of the plant material have a marked effect on the composition of the seeds. (2) The minor elements have an important effect on seed composition as catalysts, Fe, Cu and Zn increasing the oil content and B reducing it in cases where K and Cu are deficient. (3) The mineral elements of the leaf form 2 antagonistic groups, one of which is directly related to the water regime. (4) The mineral elements of the latex are directly correlated with one another and with the water regime. (5) The mineral elements of the seed are directly correlated with one another but are inversely related to the water regime. (6) Since the rubber content of the latex and the oil content of the seed are in close direct correlation, competition doubtless exists between them for mineral elements. (7) Under normal conditions of growth the latex and the seeds have 3 things in common, namely, (*a*) the translocation of N and P occurs in the same ratios, (*b*) the Ca content is very low, and (*c*) there is no inverse correlation between any 2 minor elements. (8) A "physiological diagnosis" for a stand of trees could be established on the basis of seed composition.

3159. Bolle-Jones, E. W., and Hilton, R. W.
Zinc-deficiency of *Hevea brasiliensis* as a predisposing factor to *Oidium* infection.
Nature, 1956, **177**: 619-20, bibl. 3, illus.

Anon.
Zinc deficiency of hevea in relation to *Oidium* infection.
Plant. Bull. R.R.I.M., 1956, No. 23, pp. 25-6, illus.

Seedlings of the clone Tjirandji 1 were grown in sand culture. Zinc was supplied in the complete nutrient solution at a rate of 0·065 p.p.m. Where no Zn was supplied the plants showed severe Zn-deficiency symptoms 3 months after sowing. From the sixth month onward these plants became severely infected with *Oidium heveae*, although the complete nutrient plants showed only a normal attack. Plant analysis showed that the complete nutrient plants contained 8–10 times as much Zn per plant as the Zn-deficient ones.—Rubber Res. Inst. Malaya, Kuala Lumpur.

Sugar cane.

(*See also* 2725-2729, 3191n, x, 3192k, r.)

3160. South African Sugar Journal (Editor).
The South African sugar year book 1953-54*, and *The South African sugar year book 1954-55, South African Sugar Journal, Durban, 10½×8½ in., pp. 256, and 239 respectively, illus., 10s. each (post free).

The year books contain a large amount of information on sugar growing and manufacture in South Africa. In that for 1954-55 special articles include an account of the working of a new fertilizer advisory service designed to help growers to obtain optimum production, and a discussion of the rival merits of surface and overhead irrigation. Each year book includes the contemporary annual report of the Experiment Station of the South African Sugar Association, Mount Edgecombe. Both are well produced and lavishly illustrated.

3161. Mauritius Sugar Industry Research Institute (Wiehe, P.O.).
Annual Report of the Mauritius Sugar Industry Research Institute, 1955, pp. 81 +xiv, bibls., illus.

Several of the research activities of the Institute form the subjects of abstracts presented below and in the section on Weed Control. Other work described in this report includes attempts, so far unsuccessful, to induce arrowing, studies on ratooning, the amino-acids of cane juice, the chemical diagnosis of ratoon stunting disease and a description of a self-loading trailer.

3162. DE SORNAY, A.
Cane breeding in 1955.
A.R. Mauritius Sugar Ind. Res. Inst. 1955, pp. 19-28, illus.

Promising new varieties are M.129/43, M.147/44 and M.31/45. The 2 latter have been released. Studies showed, as in 1954, a high correlation between percentage of open anthers and altitude, but in 1955 zero % for M.63/39 was reached at 700 ft. compared with over 1,000 ft. in 1954. Data are also given for other varieties.

3163. STEHLÉ, H.
Influence du facteur héréditaire variétal dans la floraison des hybrides de canne à sucre à haut rendement aux Antilles françaises. (**Effect of the hereditary varietal factor on the flowering of high-yielding sugar cane hybrids in the French Antilles.**)
J. Agric. trop. Bot. appl., 1955, **2**: 511-20, bibl. in text.

The intensity and season of flowering of 134 sugar cane varieties of widely differing origin and including the best high-yielding hybrids was studied at the Guadeloupe Agronomic Research Centre during 1949/55. Four varietal classes were distinguishable: (1) High flowering rate (up to 100%)—NCo, Co. (2) Moderate flowering rate (30–60%)—P.O.J., M(auritius), R, F, CP, PR and M(ayaguez). (3) Low flowering rate (5–25%)—the majority of the B hybrids. (4) No flowering—B.3013, B.37137, B.4425, B.4466, almost all the B.45 series (except B.4596), B.4681, B.4744, B.47258 and several B.48 and B.49 canes.

3164. JULIEN, J. H., AND DE SORNAY, A.
Planting media for sugarcane fuzz and seedlings.
Proc. 29th annu. Congr. S. Afr. Sugar Tech., 1955, pp. 115-17, illus.

Conclusions from experiments were: (1) Modified John Innes seed compost was not a better medium for fuzz than was the ordinary soil-manure mixture, although the compost was less conducive to damping-off disease incidence. (2) The soil-manure mixture was not improved by the addition of crushed basalt. (3) The best stage for pricking-out seedlings was 5 days after germination. (4) Pricked-out seedlings grew better in modified John Innes potting compost than in the ordinary soil-manure mixture for about 2 weeks, but then showed N deficiency symptoms and only resumed normal growth some days after the application of ammonium sulphate. (4) The benefits of pricking-out largely offset the cost. Ingredients for John Innes composts modified to suit local conditions are discussed.—Dep. Agric. Mauritius and Mauritius Sugar Ind. Res. Inst.

3165. ROUILLARD, G.
Cultivation experiments.
A.R. Mauritius Sugar Ind. Res. Inst. 1955, pp. 68-72.

Earthing-up. In numerous trials this practice caused a small weight increase (significant in the sub-humid and humid zones but not in the super-humid zone), had less effect on gravelly than on other soils and had no effect on sucrose content or uptake of major nutrients. *Cultivation of interlines.* In a series of experiments in the sub-humid and humid zones mechanical surface cultivation had no effect on vigour, stooling, uptake of nutrients, and yield of cane and sugar. It does, however, facilitate earthing-up, improve drainage, help in checking weed growth, and give a better tilth, which in turn renders weed control by chemicals more efficient. *Time of application of nitrogen.* The results from numerous experiments in the humid and sub-humid (irrigated and non-irrigated) zones, though statistically non-significant, are in favour of early N application (August) and show that N can equally well be applied in 1 or 2 doses. It is therefore recommended that N should normally be applied in 1 dose as soon as possible after harvesting and, at latest, before the end of the year. The normal rate of application should be 40 kg. per arpent.

3166. HALAIS, P.
Nutrition and soils. 4. Foliar diagnosis.
A.R. Mauritius Sugar Ind. Res. Inst. 1955, pp. 41-3.

Blank tests showed that reliable foliar diagnosis data can be obtained under routine field and laboratory conditions provided that there are sufficient replications. In the case studied 8 replications were required to reach full significance. Recommendations are made on leaf sampling techniques for direct P and K and for differential N foliar diagnosis.

3167. PARISH, D. H., FEILLAFÉ, S. M., AND ROUILLARD, G.
Nutrition and soils. 2. Phosphate fertilization.
A.R. Mauritius Sugar Ind. Res. Inst. 1955, pp. 36-9, bibl. 6.

The effects of superphosphate, Agrophos, Novaphos and phosphatic guano applied in the furrow before planting at 125 kg. P_2O_5 per arpent were compared at 6 stations. Superphosphate gave significantly higher responses than the other materials, which were about equal to one another in performance.

3168. STAUB, S.
The topping of sugarcane in Mauritius.
Proc. 29th annu. Congr. S. Afr. Sugar Tech., 1955, pp. 104-8, illus.

Experiments were made in Mauritius in 1954 on M.134/32 growing under various conditions of rainfall and soil to determine the point at which it would be most economical to top the cane. Canes were harvested and cut into 7 sections at specific points and the samples of the different sections were crushed and tested separately. The weight of cane harvested, the sucrose extraction %, the weight of sugar harvested and the costs of harvesting, transport and manufacture were then calculated in relation to point of topping. From the results it was concluded that topping should ideally occur just above the point of attachment of the first partially green leaf or, in special circumstances, not more than 1 or 2 nodes above that point. The top 12½% of the total cane (leaves excluded) has a purity of less than 30°.

3169. ROCHECOUSTE, E.
Cane diseases. 7. Chemical rogueing of sugarcane.
A.R. Mauritius Sugar Ind. Res. Inst. 1955, pp. 56-8.

A rapid and efficient method of getting rid *in situ* of sugar cane plants infected with diseases which can spread easily to healthy stools is a desirable control measure since the handling of diseased material is thus avoided. The chief conclusions drawn from experiments with TCA and PCP are: (*a*) Canes should be cut as close to the ground as possible and the stumps chopped with a sharp knife; (*b*) the stumps should be sprayed with TCA at 150 g./2 l. of water per 10 ft. of cane row; (*c*) the cut canes should be placed on the interlines and thoroughly sprayed with 15% pentachlorophenol emulsion at 2 gal./45 gal. water.

3170. Antoine, R.
Cane diseases. 4. Chlorotic streak.
A.R. Mauritius Sugar Ind. Res. Inst. 1955, pp. 51-4.

Plants derived from cuttings treated in hot water at 52° C. for 20 minutes may show disease symptoms some time after planting. Accepting that the hot water treatment destroys the pathogen in the setts, then there must be some active agent at work transmitting the disease, because there is ample evidence of secondary infection in certain localities. Search for a vector has so far yielded negative results. Experiments are in progress at 2 stations in the super-humid zone, where environmental conditions suit the disease, to determine the rates of secondary infection in the leading varieties Ebène 1/37, M.134/32 and B.3337. At one station no symptoms were observed where there was a 7 months' fallow before planting. At the other station, where planting began shortly after the uprooting of the previous cane crop, about 25% of the stools from the earliest planted setts became infected in 6 months and about 50% in 12 months. There were indications that time of planting may play an important part in the secondary infection.

3171. Adsuar, J.
Susceptibility of some sugarcane varieties to the heat treatment used in the control of chlorotic streak. [Spanish summary ½ p.]
J. Agric. Univ. Puerto Rico, 1956, **40**: 67-9, bibl. 5.

Thirteen sugar cane varieties were tested for their response to hot-water treatment at 52° C. for 20 minutes for the control of chlorotic streak. The treatment adversely affected the germination percentage of M.336, B.41227 and Co.281. It stimulated the germination of H.328560, P.R.1000, B.37161, B.40105, B.37172, B.371933, P.R.907 and P.R.902. It had no significant effect on the germination of P.R.905 and P.R. 980.

3172. Antoine, R.
Observations on sugar cane diseases in Australia and Fiji.
Bull. Mauritius Sugar Ind. Res. Inst. **5**, 1955, pp. 52+appendix pp. 9, bibl. 38, illus.

This bulletin deals in detail with ratoon stunting and Fiji diseases and their control. There are scale diagrams and illustrations of hot-water treatment tanks. Brief mention is made of 9 other diseases of sugar cane.

3173. Antoine, R.
Cane diseases. 2. Ratoon stunting disease.
A.R. Mauritius Sugar Ind. Res. Inst. 1955, pp. 45-8, illus.

The disease is fairly widespread in Mauritius and is commonest in the super-humid zone. In inoculation trials at 3 stations on the leading variety, M.134/32, which can be severely affected, the yield reduction caused by the disease was much the greatest at the wettest station. In control tests on M.134/32 hot water treatment at 50° C. for 2 hours reduced the percentage of canes showing symptoms when these were raised from setts not inoculated before treatment, though not when the setts had been inoculated beforehand, but it also reduced the yield from both inoculated and non-inoculated setts.

3174. Antoine, R.
La maladie du rabougrissement des repousses. **(Ratoon stunting disease.)**
Rev. agric. sucr. Maurice, 1955, **34**: 259-75, illus.

A general account of Queensland work on the disease is followed by recommendations for control in Mauritius by hot water treatment. Preliminary investigations on the disease in Mauritius are in progress.

3175. King, N. C.
Ratoon stunting disease in Natal.
S. Afr. Sugar J., 1956, **40**: 107-19, bibl. 11, illus.

The results are given of investigations on yield reduction due to ratoon stunting disease and on the effects of hot water treatment in a number of varieties commonly grown in South Africa. In an experiment on N:Co.310, for example, moderate infection reduced plant crop yield by 20%. The schedule recommended for hot water treatment is 50° C. for 2 hours, but this depresses yield in some varieties, including Co.331 and Co.301. The establishment is recommended of a network of hot water treatment tanks at mills throughout the sugar areas and of nurseries of heat-treated cane for the propagation of healthy setts.—S. Afr. Sugar Ass. Exp. Stat., Mt. Edgecombe.

3176. Dick, J.
Nitidulid beetles in sugarcane cuttings.
Proc. 29th annu. Congr. S. Afr. Sugar Tech., 1955, pp. 118-21, illus.

Nitidulid beetles, chiefly *Carpophilus humeralis*, are frequently found in sugar cane cuttings which have failed to germinate. Investigations suggest they are not a primary cause of failure since they occur practically exclusively in internodes which have already started to ferment. Tests involving the dipping of setts in insecticides and a fungicide are described. Best results were obtained with a DDT suspension. [From author's summary.]—S. Afr. Sugar Ass. Exp. Stat., Mt. Edgecombe.

Tea.

(*See also* 3191m, q, y.)

3177. Viljčinskiĭ, N. M. (Editor).
The tea plant. [Russian.]
Trudy sočin. opyt. Stan. subtrop. juz. plod. Kuljt., 1949, 7½×5 in., pp. 310, illus., price 13n.

This publication contains 14 articles by different authors on various aspects of tea cultivation in the

U.S.S.R. They deal with tea growing practices in different areas of the Soviet Subtropics, the properties of some tea soils, soil amelioration, manuring, pruning, chemical composition, the control of *Pulvinaria* (*Coccus*) *floccifera* and other pests, plucking and breeding.

3178. United Planters' Association of Southern India.
Annual Administration Report, United Planters' Association of Southern India, Scientific Department (Tea Section), for 1954/55, and *Proceedings of the Third Annual Conference, 1955,* pp. 1-21 and 22-45.

The report contains information on: *Entomology:* possible resistance of *Helopeltis* to DDT, screening of acaricides for taint, control of *Scirtothrips bispinosus* with 8 oz. dieldrin in 40 gal. per acre. *Chemistry:* Fertilizer and soil amendment trials. *Botany:* Blister blight and *Cylindrocladium* diseases, foliar fertilization, tea seed packaging, green manures and shade plants. The proceedings of the 1955 annual conference include a review of tea research in South India and papers on entomological problems and the laboratory evaluation of copper fungicides.

3179. Bahtadze, K. E.
Breeding and seed production of the tea plant. [Russian.]
Agrobiologija, 1955, No. 4, pp. 179-92, illus.

An account is given of crosses made between Indian and Chinese teas and of the yield and quality of the best selections obtained. Work on seed production consisted essentially in providing optimum plant densities in group plantings which would ensure normal cross pollination, in supplementary pollination with mixed pollen, and in the correct maintenance of the plants.

3180. Wight, W.
Commercial propagation of *Camellia sinensis* in India.
Reprinted from *Amer. Camellia Soc. Yearb. 1955*, pp. 88-100, bibl. 2, illus.

The method by which tea is propagated on a large scale by single leaf cuttings in Assam is described in detail. Factors discussed include time of year and time of day at which to take cuttings, irrigation and the use of growth substances.

3181. van Zuilen, E. J.
Invloed van jarenlange stikstofbemesting op produktie en frameontwikkeling bij thee. **(The effect of several years' nitrogen manuring on yield and branch development of tea.)** [English and Indonesian summaries ¼ p. each.]
Bergcultures, 1956, **25**: 111-17, bibl. 13.

An experiment was started in 1939 in which 4 rates of ammonia were applied to tea. Significant increases in yields, proportional to rates of manuring, were obtained, and the response increased in succeeding pruning cycles at each level of N application. By the time the sixth pruning cycle was reached it had become apparent that sulphate of ammonia had also had a favourable effect on scaffold branch development.—Proefst. C.P.V. Bogor.

3182. Džemuhadze, K. M., and Šaljneva, G. A.
Seasonal variations in the catechins of the tea plant. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1955, **105**: 1034-5, bibl. 8.

The catechin content of freshly plucked leaf (2 leaves and a bud) increased with successive flushes from the beginning of the season to a maximum in mid-summer, i.e. July, and then decreased. Throughout the season *l*-epigallocatechingallat was the main catechin present and its most intensive accumulation occurred in mid-summer when the best quality leaf for black tea was obtained.

3183. Džemuhadze, K. M., and Šaljneva, G. A.
The tannin substances of freshly harvested tea in the Krasnodar region. [Russian.]
Izv. Akad. Nauk S.S.S.R. Ser. biol., 1955, No. 6, pp. 59-66, bibl. 16.
Geographical variability of catechins in tea leaves. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1955, **104**: 880-1, bibl. 6.

The tannin content of plucked flushes (2 leaves and a bud) varies with conditions of growth. It was established that the further north tea is grown, the lower is the content of catechins and of total polyphenols. Among the catechins, gallocatechins, in particular *l*-epigallocatechingallat, predominate. The catechin content increases up to mid-summer and then decreases.

3184. Glover, P. M.
Power spraying of tea using a tractor-mounted sprayer and area spraying technique.
Two and a Bud, 1955, **2**(4): 8-10.

The new Four Oaks tractor-mounted sprayer is designed for use in conjunction with pneumatic knapsack sprayers. It has a 60-gal. tank, pressure up to 160 lb. per sq. in. and a range of 100 feet on both sides. Its main uses are discussed. These are: spraying tea, spraying shade trees, acting as a central charge pump for up to 6 knapsack sprayers, and applying selective herbicides.

Sundry crops.

(*See also* 3191h, k, t, u, 3192d.)

3185. Swaine, G.
***Helopeltis* on cashew.**
A.R. Tanganyika Dep. Agric. 1954, Part II, 1955, p. 60.

Two species of *Helopeltis* cause a die-back of young inflorescence stalks and the death of young nuts. Dusting with 5·0% DDT plus 0·5% gamma BHC gives effective control.

3186. Bhatia, B. S., Siddappa, G. S., and Lal, G.
Composition and nutritive value of jack fruit.
Indian J. agric. Sci., 1955 (issued 1956), **25**: 303-6, bibl. 17.

Analytical data are tabulated for different parts of the fruit and its seeds. Carbohydrates are predominant, mineral levels and carotene moderate and vitamin C rather low.

3187. Stahl, A. L., Kaplow, M., and Nelson, R.
The present status and future possibilities of Barbados cherries.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 138-43, bibl. 12.
A report is given of a joint project on culture, harvesting, utilization, nutritional values and processing of the Barbados cherry (*Malpighia glabra*). Propagation is by cuttings, which root readily. Irrigation is almost a necessity for large fruit and a heavy yield. Picking the fruit is costly, and handling in water tanks is suggested as a possible method of avoiding crushing the ripe fruit. Barbados cherries are a valuable source of vitamin C, which is higher in green than in ripe fruits. Freezing has produced the best product as regards ascorbic acid content, flavour and colour.

3188. Santini, R., Jr., and Nevarez, J.
Extraction of ascorbic acid from acerolas (*Malpighia punicifolia* L.). [Spanish summary ¼ p.]
J. Agric. Univ. Puerto Rico, 1955, **39**: 184-9, bibl. 10.
The ion-exchange method described would, it is considered, give 88% recovery under commercial conditions.

3189. Sánchez Nieva, F.
Extraction, processing, canning, and keeping quality of acerola juice. [Spanish summary ½ p.]
J. Agric. Univ. Puerto Rico, 1955, **39**: 175-83, bibl. 6.
The ascorbic acid content of newly extracted, hydraulically pressed juice of the acerola or West Indian cherry (*Malpighia punicifolia*) was 1·18–1·69 g. per 100 ml., or about 75% of that present in the fruit.

3190. Lynch, S. J., and Fuchs, F. J., Sr.
A note on the propagation of *Phyllanthus emblica* L.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 301-2, bibl. 3, illus.
Seeds from mature fruits gathered in spring and summer gave 100% germination and produced vigorous seedlings. Woody and root cuttings did not develop roots, but root sprouts were successful. Air layers formed some callus, but no roots were produced.—Univ. Miami, Coral Gables.

Noted.

3191.

a Anon.
Notes on the botany of the oil palm. 1. The seed and its germination.
J. W. Afr. Inst. Oil Palm Res., 1955, No. 3, pp. 73-4, illus.

b Anon.
Methods of application of fertilizers.
Plant. Bull. R.R.I.M., 1956, No. 23, pp. 35-8.
At planting time, at the post-planting stage and in mature rubber.

c Anon.
Note sur l'emploi des housses en polythène pour le conditionnement des bananes transportées en vrac nu. (**The use of polythene wraps for uncrated bananas transported in bulk.**)
Fruits d'Outre Mer, 1956, **11**: 113-14.
A general discussion, based on I.F.A.C. trials.

d Anon.
Séaux à latex pour plantation. (**Latex cups for plantation use.**)
Rev. gén. Caoutch., 1956, **33**: 137, illus.
A new light, galvanized iron latex cup.

e Azzi, G. M.
O café no México. (**Coffee in Mexico.**)
Fôlha da Manhã, reprinted in *Bol. Super. Serv. Café, S. Paulo*, 1955, **30**(337): 26-36.
Shading, culture, harvesting and economics.

f Bembower, W., and Champoopho, A.
Mango varieties of Thailand.
Indian J. Hort., 1955, **12**: 58-62, illus.
Brief notes on 37 varieties.

g Bernal, D. E.
Chromatographic determination of rubber in plant latices.
Rev. gén. Caoutch., 1956, **33**: 272-5, bibl. 16, illus.
In hevea, *Ficus elastica* and kok-saghyz; an English version of *H.A.*, 26: 1234i.

h Bodard, M.
Note sur quelques kolatiers africains. (**Note on some African kolas. I and III.**)
J. Agric. trop. Bot. appl., 1954, **1**: 312-16, bibl. 5, illus., 1955, **2**: 527-9, bibl. 2, illus.
Descriptions of several *Cola* spp. and *Ingonia* gen. nov. [For Part II see *H.A.*, 25: 4449k.]

i Brookson, C. W.
Importation and development of new strains of *Hevea brasiliensis* by the Rubber Research Institute of Malaya.
J. Rubb. Res. Inst. Malaya, 1956, **14**: 423-47, bibl. 4, being *Commun.* **298**.
Details of introductions and new breeding programme.

j Chattopadhyay, S. B., and Gupta, S. K. S.
Studies on wilt of *Psidium guajava* L., in West Bengal.
Indian J. Hort., 1955, **12**: 76-9, bibl. 4, illus.
Both *Fusarium solani sensu* and *Rhizoctonia bataticola* caused wilt in guavas.

k Chaturvedi, M. D.
***Jamun* is another of our prized trees.**
Indian Fmg, 1956, **5**(12): 17-19, illus.
Cultural notes on *Eugenia jambolana*.

l Davis, T. A., Anandan, A. P., and Menon, K. P. V.
An instance of dimorphic sex expression and compound spadices in a coconut palm.
Indian Coconut J., 1955, **8**: 150-7, bibl. 19, illus.

m DŽEMUHADZE, K. M., AND ŠALJNEVA, G. A.
A quantitative paper chromatographic method of analysing the catechins of tea leaf. [Russian.]
Biohimija, 1955, **20**: 336-8, bibl. 12.

n GOLD, A. H., AND MARTIN, J. P.
Electron microscopy of particles associated with sugar cane mosaic.
From abstr. in *Phytopathology*, 1955, **45**: 694.

o JOLLY, A. L.
Small-scale farming in the West Indies.
World Crops, 1956, **8**: 173-6, 202, bibl. 2, illus.
Including notes on "experimental unit" farms.

p KATYAL, S. L.
Hedges you can plant.
Indian Fmg, 1956, **5**(12): 39-42, illus.
Notes on hedge plants to protect orchards against cattle, etc.

q KINPYO, T., AND KAMIYA, S.
The altitude of tea-growing areas and the qualities of the tea. [Japanese, with German summary.]
Rep. Fac. Agric. Shizuoka Univ., 1953, **3**: 133-9, from abstr. in *Food Sci. Abstr.*, 1956, **28**, No. 444.
Climatic data, organoleptic tests and chemical composition.

r LAL, G., AND PRUTHI, J. S.
Ascorbic acid retention in pineapple products.
Indian J. Hort., 1955, **12**: 137-41, bibl. 16.
Including data on fresh fruit of 3 varieties.

s LOUW, D. F., AND DREYER, J. J.
A study of the vitamin C content of pawpaws.
Food Industr. S. Afr., 1955, **8**(3): 35, from abstr. in *Food Sci. Abstr.*, 1956, **28**, No. 760.

t MASSAL, E., AND BARRAU, J.
Pacific subsistence crops—sago.
SPC quart. Bull., 1955, **5**: 15 reprinted in *World Crops*, 1956, **8**: 177-9, bibl. 10, illus.
Metroxylon spp. used, methods of extraction, and analyses.

u MORTON, J. F.
The emblic (*Phyllanthus emblica* L.) a rich but neglected source of vitamin C.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 315-21, bibl. 36, illus.
A review of culture and uses in the East and potentialities for Florida.

v DE OLIVEIRA E SILVA, F. C.
Alguns aspectos da cafeicultura Caboverdeana. **(Some aspects of coffee growing in the Cape Verde Islands.)**
Rev. Café portug., 1955, **2**(7): 29-38, illus.

w ORELLANA, R. G.
Cacao diseases in Mexico, Nicaragua, Costa Rica and Jamaica.
FAO Plant. Prot. Bull., 1955, **4**: 35-7.
Brief notes on 19 diseases.

x PERK, C. G. M.
Thirtieth annual summary of chemical laboratory reports. South African sugar factories: season 1954-55.
Proc. 29th annu. Congr. S. Afr. Sugar Tech., 1955, pp. 12-27.
Including data on production and varieties.

y PORTSMOUTH, G. B., AND WEBSTER, B. N.
A guide to the protection of Ceylon tea from blister blight 1955.
Pamphl. Tea Res. Inst. Ceylon **2**, 1955, pp. 10.
Equipment and technique for spraying and dusting with copper.

z RAI, J. N.
Stylar end rot of the guava fruit (*Psidium guayava* Linn.).
Proc. Indian Acad. Sci. Sect. B, 1956, **43**: 55-61, bibl. 22, illus.
Caused by *Phomopsis* sp.; infection favoured by injuries.

3192.

a RAYNER, R. W.
Leaf rust.
Mon. Bull. Coffee Bd Kenya, 1956, **21**: 65-9, 75.
Symptoms, epidemiology and control on Kenya coffee.

b ROBINSON, J. B. D.
Rapid Kjeldahl nitrogen digestion of coffee-leaf material by the permanganate method.
Analyst, 1956, **81**: 316-18, bibl. 9.

c ROGERSON, A.
Nutritive value of pineapple residues (dried).
E. Afr. agric. J., 1956, **21**: 163.
For sheep.

d SANTINI, R., JR., AND HUYKE, A. S.
Identification of the polybasic organic acids present in guavas and acerola by paper chromatography.
J. Agric. Univ. Puerto Rico, 1956, **40**: 86, bibl. 1.
Citric, levomalic and tartaric in guava and the first two in acerola [*Malpighia punicifolia*].

e DE SILVA, C. A.
Notes on budgrafting procedure.
Adv. Circ. Rubb. Res. Inst. Ceylon **58**, 1955, pp. 7, illus.
In rubber [supersedes *Adv. Circ.* **1**].

f SINGH, L. B., AND SINGH, R. N.
Frost injury to tropical and sub-tropical fruits at Saharanpur.
Indian J. Hort., 1955, **12**: 108-14, bibl. 4, illus.
Damage to papaw and mango described.

g SINGH, R. N.
Further studies in colchicine induced polyploidy in papaya (*Carica papaya* Linn.).
Indian J. Hort., 1955, **12**: 63-71, bibl. 7, illus.
For the earlier report see *H.A.*, 24: 1017o.

h SINHA, K. S., AND SINGH, M. P.
Akand is a good green manure.
Indian Fmg, 1956, **5**(12): 9, illus.
Calotropis procera, a shrubby perennial.

i STAMBAUGH, S. U.
A new hybrid papaya: Backcross Blue Solo on Solo.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 282-4.
Hybrid vigour and fruit of more uniform size and improved flavour.

j STAMBAUGH, S. U.
Esmeralda pineapples—culture and new propagation methods from Jamaica.
Proc. Fla St. hort. Soc., 1955, 1956, **68**: 284-8.
Raising plants from 1-inch stem segments.

k STEWARD, E.
Some notes and observations on the field transport of sugar cane.
Proc. 29th annu. Congr. S. Afr. Sugar Tech., 1955, pp. 109-12.
Field tramline *vs.* road transport by lorry or tractor and trailer.

l SYLVAIN, P. G.
Le café du Yémen. (**Yemen coffee.**) [English and Spanish summaries ¾ p. each.]
Agron. trop., 1956, **11**: 62-73, bibl. 10, illus.
Arabica grown under irrigation.

m THISTLE, A.
Agricultural crops in Hawaii—II.
World Crops, 1956, **8**: 114-18, illus.
Pineapples and other fruits, vegetables and coffee.

n TIXIER, P.
Les caféières des Bolovens. (**The coffee plantations of the Bolovens.**)
J. Agric. trop. Bot. appl., 1955, **2**: 530-4.
Ecology, species grown and methods in part of Indo-China.

o URS, M. K., NATARAJAN, C. P., AND BHATIA, D. S.
A comparative study of the proteins of different varieties of coffee.
Bull. centr. Food tech. Res. Inst., Mysore, 1955, **4**: 260-1, from abstr. in *Food Sci. Abstr.*, 1956, **28**, No. 442.
Arabica and robusta.

p VALLAEYS, G.
L'amélioration du caféier Robusta. (**The improvement of robusta coffee.**)
Bull. Inf. INEAC, 1956, **5**: 27-37, bibl. 1.
Selection in the Belgian Congo.

q VEDANTAM, K.
They grow nendrans in Malabar.
Indian Fmg, 1956, **5**(11): 7-8.
Notes on the large-fruited Nendran banana grown as an annual.

r WIGGINS, L. F.
Chemistry and the sugar industry.
J. agric. Soc. Trin. Tob., 1955, **55**: 439-49.
Possibilities discussed of producing chemicals from sugar and by-products. [See also *H.A.*, 24: 2065.]

NOTES ON BOOKS AND REPORTS.

Books.

3193. AMELINCKX, F., AND AMELINCKX, S.
Lexicon Dendrologicum.
De Sikkel, Antwerp, 1955, 7½×4½ in., pp. xvi+508, bibl. 26, Belg. fr. 280.

One may reasonably assume that there are between half a million and a million species of plants on the surface of the earth and in its waters that have to be distinguished for scientific or economic purposes. For general purposes of determination, that is for filing and passing on information, names have considerable practical advantages. Biological nomenclature is not a subject to everyone's taste, but all biologists will agree that precision and stability in the use of names for plants and animals are desirable. There are many difficulties in attaining the ideal of a final, most useful and generally accepted set of names, in spite of International Rules. One sometimes wishes for priority to such a rule as "There must be stated ten valid reasons concretely applicable, before a well-known name is changed". In the meantime, carefully prepared lists of names, that can be adopted for special groups of plants with a good chance of reasonable stability, are extremely useful. The book here under notice is an alphabetical list of genera and species of woody plants in cultivation, or which could be cultivated out-of-doors in Europe, according to the Latin names used in Rehder's *Manual of Cultivated Trees and Shrubs*. Synonyms and Dutch, Flemish, English-American and German names are given and are indexed separately. Some varieties are named, especially in the list of conifers.

The difficulties of fixing vernacular names are different from those met with in botanical nomenclature based on international Latin. They often vary locally for native plants and some have long histories. The authors of *Lexicon Dendrologicum* have made a limited and apparently judicious selection. There has, however, been some compromise between English and American usage, as in "English Ash" for *Fraxinus excelsior* and "English Oak" for *Quercus robur*.

This book should be valuable for reference to all concerned with trees and shrubs who have not got Rehder's standard works available. W.B.T.

3194. BLUNCK, H.
Handbuch der Pflanzenkrankheiten, Bd. V, Tierische Schädlinge an Nutzpflanzen, 2. Teil, Lief. 3: Heteroptera, Homoptera, 1. Teil. (**Handbook of Plant Diseases. Vol. V, insect pests of crop plants, Part 2, Sect. 3: Heteroptera, Homoptera, Part I.**)
Paul Parey, Berlin and Hamburg, 1956, 10×7 in., pp. 399, bibls., illus., DM. 94.

The much awaited new edition of this section of an

indispensable work confines itself to the noxious species of the important order Hemiptera, excluding the Aphidoidea and the Coccidoidea. The volume is edited by Professor Blunck, assisted by the well-known Hemipterists, Dr. E. Otten (Heteroptera) and Dr. H. J. Müller (Homoptera).

The first part of this work is devoted to the Sub-Order Hemiptera-Heteroptera, and to gain some idea of the importance of the plant bugs and their association with agricultural and horticultural trees and plants it should be noted that 15 families of plant bugs are included, many of which contain some of the most important pests of these crops. For example, 36 pages are devoted to the important family Miridae (Capsidae), and it may be noted that a few of the species mentioned, i.e. *Psallus ambiguus* Fall., might well have been regarded as beneficial rather than harmful.

Atractotomus mali Mey-Dür. is another species which is largely predacious, and this has but one generation each year and not two as stated (p. 110). As a departure from the earlier editions the numerous references to the literature of the Heteroptera, covering 15 pages but given all too briefly, are placed at the end of the first part of the book and not at the bottom of each page as formerly. The latter arrangement is to be preferred since specific references are much easier to find when there are not too many of them.

Rather more than half the book deals with the Sub-Order Hemiptera-Homoptera, and no less than 16 families are represented, including the Fulgorids, the Frog Hoppers, the Lantern Flies, the Leaf Hoppers, the Membracids, the Psyllids and the White Flies. This much enlarged and well informed part of the work is particularly welcome, not only to the economic entomologist but also to the virologist, since many of the species mentioned are recognized vectors of plant virus diseases. Another welcome innovation is the introduction to the "hoppers", which gives detailed descriptions of the mouth parts together with notes on the feeding habits, and also figures of the feeding tracts of these insects.

Many species of Homoptera not mentioned in the earlier editions are included, and the editor and those concerned are to be contragulated in bringing together under one heading so much recent research in relation to the Hemiptera-Heteroptera and the Hemiptera-Homoptera associated with cultivated plants and trees.

A.M.M.

3195. Chilean Nitrate Educational Bureau, Inc.
Bibliography of the literature on the minor elements and their relation to plant and animal nutrition, 4th edition, Vol. IV.
Chilean Nitrate Educational Bureau, Inc., 120 Broadway, New York, 1955, 11 × 8½ in., pp. 150.

This volume covers the period between January 1953 and December 1954 and contains 1,363 abstracts, mainly obtained from *Chemical Abstracts* and *Soils and Fertilizers*, on 31 elements.

3196. Dames, T. W. G.
The soils of east central Java.
Contr. gen. agric. Res. Stat., Bogor **141**, 1955, 11 × 7½ in., pp. 155, bibl. 44, illus. +soil map.

A chapter on soils and agriculture (pp. 126–41) contains brief but informative notes on manurial and green-manuring practices on sugar cane, tobacco, rubber, tea and coffee estates, and on a fertilizer experiment on capsicum.

3197. Forsyth, A. A.
British poisonous plants.
Bull. Minist. Agric. Lond. **161**, 1954, 9½ × 6 in., pp. 116, bibls, illus., 6s. 6d.

Although mainly concerned with plant poisoning among farm livestock, this bulletin will be of interest to horticulturists for the comprehensive annotated list of poisonous plants, many of them common weeds or cultivated species, which is classified according to families. There is also a section dealing with the various types of poisonous substances found in plants. The text is exceptionally readable and full of interesting information.

3198. Goold-Adams, D.
The unheated greenhouse.
Collingridge, London, 1955, 8½ × 5½ in., pp. 176, illus., 18s.

In gardening parlance the term cold greenhouse has come to mean a greenhouse in which the temperature does not fall below, say, 45° F., a condition which cannot be achieved without some form of heating in cold weather. This well-illustrated book is about greenhouses with no artificial heating whatever. Though the simplest procedure under these conditions is to stock the greenhouse with plants which are hardy outside, there are many so-called tender plants that can also be managed successfully. It is one of the aims of this book to show how this can be achieved. The number of plants of all descriptions, not necessarily tender but giving their best display when under some protection from the weather, is very large. Two hundred genera are discussed in this book and it does not pretend to be exhaustive.

Owners of unheated greenhouses are haunted by the fear of frost. It is not possible to exclude frost in a hard winter but there are many simple devices by which its effects can be lessened and these are described in a special chapter, further advice when needed being included in the cultural notes on individual species. These notes should be studied for they contain many "wrinkles" which the amateur will find invaluable. Mrs. Goold-Adams has the knack of producing some useful tip outside routine methods for practically every plant she mentions. Each class of plant (bulbs, shrubs, succulents, annuals and others) has a chapter to itself, and there are also chapters on potting, propagation and other cultural matters.

The book is written on a note of gay enthusiasm which might become irritating but somehow doesn't, for the author's full understanding of her subject and her ability to put it over earns the reader's respect. In conclusion she suggests that to stock a greenhouse successfully one must have time and/or money, or, failing either, then charm. How she is situated as regards the first two of these commodities is not known, but after reading her book our guess is that she must be pretty well equipped with the third. G.St.C.F.

3199. GRÜMMER, G.
Die gegenseitige Beeinflussung höherer Pflanzen—Allelopathie. **(The influence of higher plants on each other—allelopathy.)**
Gustav Fischer Verlag, Jena, 1955, 10×7 in., pp. 162, bibl. pp. 17, illus., DM. 12.

The term allelopathy was coined by Molisch in 1937 to denote the effect of one plant on another, with special reference to ethylene. Since then antibiotics have come into the picture and with them a confusion of the terminology. In the new definition given by Grümmer the term allelopathy is reserved for the action of *higher* plants on each other by so-called "kolines", i.e. metabolic products with an inhibiting action. Antibiotics (metabolic products of micro-organisms acting on micro-organisms), marasmins (metabolic products of micro-organisms causing wilting in higher plants) and phytoncides (metabolic products of higher plants inhibiting micro-organisms) do not therefore fall within the compass of the book.

By reviewing the relevant literature since 1937 from a modern point of view based on quantitative criteria the author re-establishes allelopathy as a field of study which throws light on several branches of pure and applied botany. He makes ethylene his starting point and then proceeds to discuss other gaseous secretions of higher plants and liquid and solid exudates from leaves. Soil sickness and the relationship between weeds and cultivated plants are dealt with in two chapters devoted to root exudation. The book concludes with two further chapters on the relationship between parasitic or semi-parasitic higher plants and their hosts and on the mutual interactions of different pollens and of pollen and stigma. Suggestions for future lines of research are also made. V.H.G.

3200. JACKS, G. V., BRIND, W. D., AND SMITH, R.
Mulching.
Tech. Commun. Commonw. Bur. Soil Sci. **49**, 1955, 9½×7½ in., pp. 87+plates, bibl. 275, illus., 15s.

This is the first of two or more Technical Communications that will be issued separately by the Commonwealth Bureaux of Soil Science and of Horticulture and Plantation Crops. In this first communication the world literature is reviewed on (1) the effects of mulching on soil properties, and (2) the system of mechanized stubble-mulch farming. A second communication, dealing with the practical aspects of mulching vegetable crops, is in course of preparation by the Bureau of Horticulture.

3201. KRISCHE, P., GEISSLER, T., MULDER, D., AND OTHERS.
Zwei Verbündete—Kalium und Magnesium. Beiträge zur Frage der Kali- und Magnesiumdüngung. **(Two allies—potassium and magnesium. Contributions to the problem of potassium and magnesium applications.)**
Deutsche Waren-Vertriebsgesellschaft m.b.H., Berlin, 1953[?], 8×5½ in., pp. 204, bibls, illus.

The symposium includes among others the following papers:

Krische, P., The nutrient content of the more important agricultural and horticultural plants, pp. 36-9: Vegetables, hops, tobacco and plantation crops.

Geissler, T., On the problem of magnesium applications in vegetable growing, pp. 40-58, bibl. 15.

Mulder, D., Magnesium deficiency in fruit plants, pp. 91-106, bibl. 12, colour plates.

3202. MAATSCH, R. [EDITOR].
Pareys Illustriertes Gartenbau Lexikon. 5. völlig neubearbeitete Auflage. Band I, A-K. **(Parey's Illustrated Horticultural Dictionary. 5th fully revised edition. Vol. I, A-K.*)**
Paul Parey, Berlin and Hamburg, 1956, 11×7½ in., pp. 645, illus., DM. 69.

This encyclopaedia with contributions from the leading experts in western Germany, its clear type, good paper and highly instructive illustrations will prove a useful delight to every horticulturist who can read simple German.

It concerns not only plants but horticultural phenomena, for instance, *Abbau*, which perhaps one might translate as Decline, and its significance, and horticultural operations such as *Kulturplan*, *Arbeitsvorbereitung* and the like. Horticultural celebrities, not necessarily German, also come to light, along with botanical gardens and horticultural implements, in fact everything horticultural. Naturally emphasis is on German horticulture, but for that very reason this book should be of particular value to those whose business it is to examine German literature and find equivalents for its particular terms in another language. We commend it especially for its clarity of expression, which is not always a feature of such works either English or German. D.A.

3203. METCALF, R. L.
Organic insecticides.
Interscience Publishers, New York and London, 1955, 9×6 in., pp. x+392, bibls., 68s.

Organic pesticides, especially insecticides, now far outweigh inorganic in range and accomplishment. This is reflected in this volume which is devoted exclusively to organic insecticides and is, in fact, a development of the same author's "The mode of action of organic insecticides" published in 1948 as Review No. 1 of the Chemical-biological Coordination Center, Washington, D.C.

The author devotes 3 of his 14 chapters to the "natural" insecticides: nicotine and its close relatives, rotenoids and pyrethroids. A chapter follows on joint action of insecticides, a subject studied almost exclusively in relation to pyrethroids. Then come 7 chapters on synthetic insecticides: DDT and important relatives; BHC; the family prepared by the Diels-Alder diene synthetic process, i.e. chlordane, aldrin, dieldrin, etc.; the organophosphorus compounds (9 groups); the thiocyanates; DNC and its higher homologues such as dinoseb and dinex; and the carbamates, which, like the organophosphorus compounds, are cholinesterase inhibitors. There are also chapters on acaricides,

* Vol. II. L-Z, to appear later in 1956 at a similar price.

miscellaneous organic insecticides, and on insect resistance to insecticides.

The general pattern of each chapter is an initial account of the chemistry of the insecticide or group and of the relation of structure in the group to toxicity, followed by a discussion of the mode of action considered probable, and finally by a review of mammalian toxicity.

The author has made important contributions in a number of fields, especially on systemic insecticides, and is well qualified to write such a book. It is therefore not surprising that it should be lucid and well organized as well as stimulating. The type and lay-out are clear and there are ample formulae; each chapter has its own bibliography, and there is an adequate index. The number of errors seems to be exceptionally low. A.H.M.K.

3204. Podubský, V., and Štědronsky, E.
Vodni, bazinne a pobrezni rostliny. **(Water, bog and hydrophytic plants.)**
Státní Zemědělské Nakladatelství, Praha, 1954, 9½×7 in., pp. 215, illus., Kčs 39.70.

While the subtitle of this book, "Occurrence, life history and importance, especially in fisheries", indicates its main purpose, it may be of interest to horticulturists to note that the suitability of some species for growing in garden ponds is indicated and that a chapter is devoted to plants possessing medicinal properties. The latter group includes *Archangelica officinalis*, *Veronica officinalis*, *Menyanthes trifoliata*, *Polygonum aviculare*, *Scrophularia nodosa* and *Symphytum officinale*. The mechanical control of undesirable water plants is also described.

3205. Siimon, A.
Eesti NSV kohalikud külmakindlad puuviljasordid. **(Frost-resistant tree fruit varieties in Estonia.)** [Russian summary 13 pp.]
Eesti Riiklik Kirjastus, Tallinn, 1955, 9×6 in., pp. 54, colour plates xxxi, Rbl. 9.05.

As a result of the very severe winter of 1939/40 and of the second world war the number of fruit trees in Estonia has been greatly reduced, but since then, and especially since 1948, work has been in progress to rehabilitate the industry [see also *H.A.*, 25: 1373m]. In this booklet short general descriptions are given of 18 apple varieties, 5 pears, 8 plums and 1 cherry, which are either included in the standard assortment of recommended varieties or are commonly grown near their place of origin. In each case coloured plates are provided showing the fruit whole and in longitudinal section.

3206. Thomas, D. G.
The gladiolus for garden and exhibition.
Collingridge, London, 1955, 8½×5½ in., pp. 94, illus., 15s.

The first chapter is entitled "From Sunny South Africa to Colour the World". This with some pretty play on the word "glad" and a promise that reader and author were going to have many good laughs together caused a deep depression to centre over this reviewer, which was only dispersed by the discovery that in spite of his "light and pleasant style" [quote from jacket blurb] the author really did know his corms. It is doubtful whether anyone would buy a book on gladiolus, especially one of but 94 pages and costing fifteen shillings, if he did not hope either to exhibit or to market the things. The author shows himself to be aware of this, and certainly does all he can to ensure success in either direction. There are the usual chapters on cultivation and an unusual one on the evolutionary trends of the gladiolus of the future. This chapter, together with that on breeding, is full of pertinent and constructive suggestions. As a floral decoration the gladiolus is notoriously difficult to arrange without giving the impression of a battalion of Guards on parade, and a few ideas are provided to counteract this too rigid symmetry. Finally there is a chapter in which the merits and failings of the best modern varieties are discussed with care and discrimination. In fairness we have to say that though we began to read with a marked distaste for gladioli, the simple enthusiasm of the writing became contagious and by the end, like the author's young lady who was kissed under a horse chestnut tree, we knew we had been conquered! G.St.C.F.

3207. Whitehead, S. B.
Fruit from trained trees.
J. M. Dent & Sons Ltd., London, 1954, 7½×5 in., pp. 151, illus., 10s. 6d.

In spite of the greater skill needed in the training and management of dwarf forms of fruit trees compared with the "free-growing" forms, their popularity among amateur gardeners has markedly increased during recent years. The factors mainly responsible for this modern tendency appear to be limited space and an appreciation of good quality fruit, which can most easily be obtained on trees that can be handled and inspected from the ground. Subjugating nature, however, is a difficult art, and in the production of "artificial" forms of trees the amateur needs careful guidance on such subjects as rootstocks, pruning and manuring.

Such guidance was most excellently provided by D. Macer Wright in his book *Dwarf Fruit Trees* published in 1953 [see *H.A.*, 23: 3651). This new handbook by S. B. Whitehead, however, is not so superfluous to the possessor of *Dwarf Fruit Trees* as its title might suggest. The earlier book dealt admirably with the culture of dwarf forms of the main tree fruits, namely apples, pears and plums, and as far as these are concerned Mr. Whitehead has little new to add excepting brief descriptions of the more elaborate forms of cordon and espalier training. He covers new ground, however, in dealing with nectarines, peaches, apricots, cherries, figs and (with a cheerful disregard of his title) currants, gooseberries, the bramble fruits and outdoor vines. The information given is necessarily limited, but useful guidance is given on soil management, rootstocks (where applicable), planting, training, manuring, varieties, pest and disease control and in some cases harvesting. Of special interest to the amateur with a small garden will be the plans showing possible layouts of plots supplying a wide selection of fruits from a small space. P.R.-D.

Annuals and reports.

3208. Algérie, Gouvernement Général.
Rapport du Conseil de l'Expérimentation et des Recherches agronomiques pour 1954. **(Report of the Council for Experimentation and Agronomic Research for 1954)**, Algiers, 1955, pp. 262.

A wide range of activities, some of which are described in separate abstracts, include: *Soils:* manuring of tobacco, vines, date palms and citrus; irrigation of citrus. *Tobacco:* selection. *Vines:* rootstock trials and propagation, and trials on vinifera and hybrid dessert and wine varieties, and on summer pruning. *Date palms:* planting, pollination and fruit thinning. *Figs:* varietal studies. *Olives:* varietal and flowering studies. *Citrus:* clonal selection, control of irregular bearing, non-cultivation, eucalyptus windbreaks and maturity tests. *Avocadoes:* varietal studies. *Flower crops:* gerberas, carnations, bulbs. *Vegetables:* processing varieties of bean and tomato, mushrooms. *Phytohormones:* parthenocarpy, fruit size and fruit crop control studies on citrus, herbicidal studies on vines. *Plant pathology:* control of crickets, *Bruchus lentis*, phylloxera, vine downy mildew, *Myelois ceratoniae* and *Prays citri*.

3209. Almindelig Dansk Gartnerforening (Danvig, A. M., and Pedersen, K.).
Årbog for Gartneri 1955. **(Horticultural Yearbook 1955.)**
S. L. Møllers Bogtrykkeri, Copenhagen, 1956, pp. 242, illus., Kr. 5.

As usual, the first part of the Yearbook (pp. 7-97) is in the form of a directory which presents comprehensive information on many aspects of Danish horticulture and its organization. Short reports on small-scale manurial trials by commercial growers (pp. 102-16), carried out under the auspices of the Danish Market Gardening Association, include the following crops: cucumbers, celery, onions and chrysanthemums. In the ornamental section (pp. 130-42) results are given of variety trials with roses, chrysanthemums and dahlias. The Yearbook concludes with the 36th Annual Report of the Committee for Vegetable Variety Trials (pp. 130-239), the chief results of which are condensed in an English summary of pp. $2\frac{3}{4}$.

3210. Argentina.
Progreso realizado en las investigaciones agrícolas en 1954. **(Advances in agricultural research in 1954.)**
Idia, 1955, Nos. 90/92, pp. 192, illus.

A report is made on agricultural research carried out in 1954 at the National Agricultural Research Centre at Castelar, Buenos Aires, and at 5 regional centres. Subjects of horticultural interest investigated at the National Centre included: Selection and culture of kok-saghyz; sugar cane smut inoculation; breeding and selection, diseases and pests, and freezing points of fruits and vegetables; date vinegar; insecticidal residues on fruit; and tobacco quality and sugar cane yield in relation to soil fertility. Among the crops investigated at the Regional Centres were: hemp, citrus, vines, avocadoes, vegetables, temperate pome and stone fruits, date palms, tobacco and sugar cane. A map shows the location of the National Centre and all the regional centres and experimental stations and sub-stations of the Ministry of Agriculture.

3211. Beran, F. [Editor].
Tätigkeitsbericht 1951–1955 der Bundesanstalt für Pflanzenschutz, Wien. **(Report of the Institute for Plant Protection, Vienna, for 1951-1955)**, Vienna, 1956, pp. 288.

Much of the work collected in this report has already been published in the *Pflanzenschutz-Berichte*, but in addition there are 4 original articles, one of which is abstracted separately [see Abstract 2594].

3212. Central Experimental Farm, Ottawa (Davis, M. B., and others).
Progress Report Horticulture Division, Central Experimental Farm, Ottawa, 1949-53, 1955, pp. 205, bibls, illus.

Brief summaries are given of work which has already been published, while additional, more recent data and those from newer experiments are presented in more detail [see separate abstracts].

3213. East African High Commission.
Annual Report East African Agriculture and Forestry Research Organization, 1955, pp. 114, 3/50s.

Research included investigations on pyrethrum flower bud differentiation in relation to bud disease (*Ramularia bellunensis*) and on strawberry virus diseases.

3214. East Malling.
Annual Report East Malling Research Station 1955, 1956, **A39**, pp. 162, bibls, illus., 12s. 6d. post free in G.B., postage extra overseas, U.S.A. $2.00.

As in former years the report is divided into 4 parts, namely, (1) the experimental farm, (2) a general review of research work in progress with lists of papers published during the year, (3) research reports and reviews, and (4) bulletins for fruitgrowers. Most items in (3) and (4) are abstracted or noted separately.

3215. Gold Coast.
Annual Report of the Department of Agriculture for the year 1953-54, 1956, Accra, pp. 30, 3s. 6d.

Research subjects included: *Cacao*. Uniformity, fertilizer and variety trials on Amelonado, Amazon and hybrid selections; black pod disease; hanane as an aid to the control of swollen shoot disease. *Other crops*. Bananas, citrus, coconuts, coffee, oil palms, pineapples, sugar cane and tobacco.

3216. Hellyer, A. G. L. [Editor].
Amateur gardening annual 1956.
Amateur gardening, Tavistock St., Covent Garden, London, W.C.2, 1956, $10 \times 7\frac{1}{2}$ in., pp. 118, illus., 5s.

Forty articles skim the cream of present knowledge of immediate value to the amateur gardener in Great Britain.

3217. Institut des Fruits et Agrumes Coloniaux.
Rapport de la Station centrale des Cultures fruitières, Kindia (Guinée française), 1954. **(Report of the Central Fruit growing Station, Kindia (French Guinea), 1954,** pp. (not numbered serially) approx. 580.

Variety collections and study plots. Citrus, pineapple, banana, avocado, mango, papaw and other fruits, cover crops. *Citrus.* Rootstock trials, planting with explosives. *Pineapple.* Control of flowering with growth substances, manuring, weed control, types of suckers, growth studies. *Banana.* Irrigation, fertilization, organic manuring, soil conditioners and other amendments, spacing, removal of male flower bracts to increase fruit weight. *Entomology.* Banana: control of *Cosmopolites sordidus* and *Radopholus similis.* Pineapple: introduction of *Cryptolaemus montrouzieri* for the control of *Ferrisia virgata. Zonocerus variegatus* control. *Pathology.* Banana: false mosaic (*Hormodendron* sp.), cercospora, cigar-end disease (in the Cameroons). Citrus: several disorders including Eureka canker. Mango: scab-anthracnose complex, canker. Avocado: scab, oidium, cercospora. *Biochemistry.* Composition and maturation of pineapple, avocado and banana. *Plant Nutrition Laboratory.* Banana growth studies. [The 1953 report has also been received.]

3218. Jordan, Ministry of Agriculture.
Third Annual Report 1954 of the Agricultural Research Service, pp. 36, 100 fils.

Mentha piperata: potash and phosphate applications gave significant increases in yield; there was little difference in yields from rhizomes transplanted at 10-day intervals between 25 January and 14 February, but transplanting on 1 March appeared to be rather late. *Vegetables:* varietal trials with marrows, peas, beans, cabbages, cauliflowers and tomatoes; transplanting trials with tomatoes; tomatoes spaced at 120×80 cms generally gave the highest yields; phosphate had a beneficial effect on tomato yields, but N applied alone had an adverse effect.

3219. Kenya.
Annual Report of Kenya Department of Agriculture for 1954, Vol. II, Record of Investigations, 1955, pp. 253, Sh. 7/50.

Coffee: control of *Planococcus kenyae, Diarthrothrips coffeae* and *Anthores leuconotus;* insecticide taint trials; tonic copper spraying; cultivation; pruning; varieties; manuring; mulching; weed control. *Horticulture:* temperate fruits at Molo; subtropical and tropical fruits at Ruiru and the Coast; vegetables. *Pyrethrum:* pyrethroids; bud disease; picking/mowing; nursery trials; fertilizing; rotations; breeding. *Sisal:* nursery trials; planting material; spacing; cutting; cultivation; fertilizing; hybrid varieties; selection; herbicides. *Sugar cane:* fertilizing; varieties; herbicides.

3220. The Macaulay Institute for Soil Research.
Annual Report of the Macaulay Institute for Soil Research for 1954/55, Craigiebuckler, Aberdeen, pp. 75, illus.

The Plant Physiology Section (pp. 37-40) reports (1) an extension of investigations to cover all forms of chlorosis in plants, whether they are caused by deficiency or excess of elements or are of genetical or virus origin; and (2) radioactive studies including estimation of plant-available P, a technique for tracing the root systems of plants, and the distribution of various mineral elements in plants.

3221. Marloth, R. H.
Citrus and subtropical fruit research. [Forming part of the Annual Report of the Secretary for Agriculture, Union of South Africa, for the year ended 31 August, 1955.]
Fmg S. Afr., 1956, **31**: 137-41.

Research at the Addo Citrus and the Nelspruit Subtropical Horticultural Research Stations in 1954/55 covered the following subjects: *Citrus:* Varieties, strains, rootstocks, cultural practices, irrigation, acid-reducing sprays and fruit testing technique. *Subtropical fruit:* vegetative propagation, avocado pollination, vine pruning. *Vegetables:* Tomato varieties and manuring, onions. *Breeding:* Fruits, vegetables. *Pathology:* Citrus fruit wastage, avocado stem-end decay. *Entomology:* Control of fruit flies and citrus red mite, combination sprays. *Low temperature storage:* Citrus, banana, litchi, avocado.

3222. Massachusetts.
Annual Report 1953-1954 of Massachusetts Agricultural Experiment Station, being *Bull.* **482**, [1955?], pp. 105.

Among studies described in abstract form are the following: *Agronomy:* Tobacco irrigation and seed bed preparation. *Botany:* Fungus and virus diseases of carnations; promising fungicides for apple disease control; breeding forcing tomatoes for *Cladosporium* resistance; diseases of cabbages and parnsips; tobacco frenching. *Chemistry:* Butternut squash seed germination and fruit composition. *Entomology:* Orchard pest control with malathion; midsummer applications of acaricides for red mite control; onion thrips control; control of insect pests of ornamental trees and shrubs; biology and control of grape cane girdler; control of cucurbit insects in relation to yield; control of glasshouse pests, plum curculio in apple, and cabbage and apple maggots. *Landscape Architecture:* Factors increasing the rapidity of growth of nursery stock; chemical weed control in the nursery; azalea hardiness. *Shade Tree Laboratories:* Tree diseases. [See also separate abstracts in sections on Tree fruits, Small fruits, Vegetables and Floriculture.]

3223. Naaldwijk.
Jaarverslag over 1955 van het Proefstation voor de Groenten- en Fruitteelt onder Glas te Naaldwijk. **(Annual Report for 1955 of the Research Station for Fruit and Vegetable Growing under Glass, Naaldwijk),** 1955, pp. 76.

Trickle irrigation experiments were started with tomatoes. *Manurial trials* were continued with grapes, peaches, tomatoes, lettuces and cauliflowers. *Cultural trials* were continued with gladioli, freesias, antirrhinums, grapes, tomatoes, lettuces, melons, cucumbers, eggplants (grafting) and strawberries (forcing). *Physiological research* was concerned with lettuce vernalization, root development of tomato, lettuce and cucumber plants, the effect of soil temperature on P uptake by young tomato plants, and the application of illumination and foliar nutrient solutions to tomato and cucumber plants. *Hormone experiments* were concerned with tomato pollination, fruit setting of melons and plums, flower formation in cucumbers, lettuce and radish growth, and grape pollen storage. *Breeding, variety*

trials and selection with peaches, plums, grapes, tomatoes, cinerarias, eggplants, paprika, cauliflowers, lettuce, endive, spinach, scorzonera, melons, cucumbers, beans, sprouts and strawberries. *Storage and packing trials* with cauliflowers, melons, tomatoes, cucumbers and grapes. *Pest, disease and weed control* with several crops. [For a separate article on freesia corm storage see abstract 2992.]

3224. NAUDE, T. J.
Entomology. [Forming part of the Annual Report of the Secretary for Agriculture, Union of South Africa, for the year ended 31 August 1955.]
Fmg S. Afr., 1956, **31**: 88-92.

Work reported briefly includes the biological control of *Ceroplastes helichrysi* var. *sinoiae* on jacaranda, *Neocleora tulbaghata* on citrus, and *Nezara viridula* on vegetables by *Microphanurus basalis*. Virtually complete control of 4th and 5th instars of the wattle bagworm was obtained in 7 days with 2 oz. endrin per 3 gal. diesolene per acre. Research was also carried out on citrus and tobacco pests, fruit flies, gladiolus fly, nematodes, systemic and other insecticides, and red-bill finches (*Quelea quelea lathami*).

3225. NEL, R. I.
Deciduous fruit research. [Forming part of the Annual Report of the Secretary for Agriculture, Union of South Africa, for the year ended 31 August 1955.]
Fmg S. Afr., 1956, **31**: 132-6.

Research at the Western Province Fruit Research Station in 1954/55 covered the following subjects: *Cross pollination:* Apple. *Pruning:* Peach, pear, apple. *Subtropical fruits:* Studies on varieties and seedlings of avocado, pecan, olive, persimmon, walnut, macadamia, pistachio, cherimoya and *Feijoa sellowiana*. *Vines:* Biochemistry, spacing, soil cultivation. *Breeding:* Guava, apple, peach, strawberry, plum, vine. *Nutrition:* Minor element deficiencies in apple, pear, plum, apricot, peach. *Diseases and pests of deciduous and evergreen fruit trees and vines. Physiology:* Hormones in peach buds, growth substance sprays to improve Zante currant set, respiration and heat production in apricots. *Storage and transport.* Effect of subfreezing temperatures on the storage life of deciduous fruits, gas storage of stone fruits, polyethylene and other boxliners, melon storage, analysis of waterlogged pineapples. *Engineering:* Rooibos tea bruising machine.

3226. NEVELING, C. H.
Annual Report of the Secretary for Agriculture, Union of South Africa, for the year ended 31st August, 1955.
Fmg S. Afr., 1956, **31**: 40-175.

This report consists of the Secretary for Agriculture's own report on administrative services, assistance measures and production and consumption of the main agricultural products, and of reports by the various sections of the technical services, some of which are abstracted separately. The following crops and subjects are among those being investigated at the regional stations. *Winter-rainfall region:* Control of St. John's Wort, and work on deciduous fruits, vines, tobacco and vegetables. *Karoo and Eastern Cape region:* Pineapples; chicory as a cash crop in the pasture rotation. *Orange Free State region:* Vegetables, peaches, plums and vines. *Transvaal region:* tobacco, sisal and castor beans. *Natal region:* Pecans, pineapples, papaws and vegetables.

3227. NEW HAMPSHIRE.
Sixty-sixth Annual Report of the Director of the New Hampshire Agricultural Experiment Station, July 1, 1953, to June 30, 1954, being *Stat. Bull.* **418**, 1955, pp. 49, illus.

Horticulture (pp. 31-7): Brief mention is made of work on apple nutrition, mulching and rootstocks; new varieties of bean, tomato, raspberry, Cape gooseberry (*Physalis*), chestnut, monarda and lilac; hardy roses; and aluminium foil wraps for healing tree wounds.

3228. ONTARIO DEPARTMENT OF AGRICULTURE (VINELAND).
Biennial Report of the Horticultural Experiment Station and Products Laboratory [Vineland] for 1953 and 1954, pp. 153, illus.

Most of the papers in this report have been abstracted separately. In addition to these, the report of the Horticultural Experiment Station contains notes on the packing of peaches, cherries and plums, and a summary of work on plum breeding at Vineland over the period 1913–37. There is also an account of tomato breeding for resistance to leaf mould, and a description of the new resistant variety Vagabond.

3229. SUMMERLAND, BRITISH COLUMBIA.
Summary of Annual Reports, Summerland, B.C., 1955, 1956, pp. 16.

Brief notes are given on results obtained from work by the various units of the Canada Department of Agriculture on insects, diseases, vegetable culture, tree fruits, orchard soils and irrigation.

3230. TANGANYIKA (SOPER, J. R. P.).
Annual Report of the Department of Agriculture, 1954, Part II, 1955, pp. 129, price Shs 6/50.

Research carried out included the following: *Coffee Research Station, Lyamungu, Moshi:* Clone and seedling trials, intercropping/manuring, effect of mulching on soil nitrate level, mucilage removal by chemicals, time of pruning, pruning systems [see also *H.A.*, 25: 2161]. *Maruku Coffee Station, Bukoba:* Soil fertility, banana establishment, cover cropping and interplanting, coffee progeny. *Mbosi Coffee Substation, Southern Highlands Province:* Mulching, pruning, dieback, blacktip. *Sisal Research Station, Mlingano, Ngomeni* [see *H.A.*, 26: 832 and abstract 2930]. *Entomology:* Cashews: *Helopeltis* control [see abstract 3185]. Coffee: confirmatory trials on control of white borer, control of *Antestia* with Swingfog, investigations on *Leucoptera coffeella* and *Stephanoderes hampei*, temperatures under wound dressings. *Pathology:* Investigations on the diseases of perennial crops, vegetables and ornamentals. *Field experiments, Southern Highlands:* Pyrethrum: cultural experiments [see abstract 2937]. *Coast Agricultural Station, Chambezi:* Coconuts: annual intercropping before bearing, size of planting hole, manuring. Cashews:

strains. Pineapples: fertilization/mulching. [The reports for 1949 to 1953 have also been received.]

3231. U.S. Department of Agriculture.
Marketing, being *Yearbook of Agriculture 1954,* Supt. Documents, Washington, D.C., 9×6 in., pp. 506, $1.75.
The chapters of this Yearbook are arranged to give first a general view of the components of the U.S. marketing system for agricultural produce at home and abroad, then a description of its major parts, and finally discussions of its many problems. Grading, packaging, storage and processing are among the subjects dealt with. There is also an Atlas of Marketing in which are described the handling and marketing channels of various types of produce, including fruits and vegetables, sugar and tobacco.

3232. U.S. Department of Agriculture.
Water, being *Yearbook of Agriculture 1955,* Supt. Documents, Washington, D.C., 9×6 in., pp. 751, bibls, illus., $2.
The primary aim of this Yearbook is "to explain the nature, behaviour, and conservation of water in agriculture". Many of the aspects covered, such as the needs and uses of water by plants, sources of water, weather, water in relation to soil, care of watersheds and drainage of fields, are of fundamental importance to all those concerned with the growing of crops. Of direct interest to horticulturists are the sections entitled "Water for irrigation", "Water and our crops", and "Gardens, turf and orchards".

New periodicals.

3233. Boalch, D. H. (Editor).
Quarterly Bulletin of the International Association of Agricultural Librarians and Documentalists.
[*Quart. Bull. int. Ass. agric. Librns*], 1956, Vol. 1, Nos. 1 and 2, Library, Rothamsted Experimental Station, Harpenden, Herts, England, obtainable only through membership of the Int. Ass. agric. Librarians and Documentalists, annual sub. 50 Swiss francs or £4 2s. 6d. or $12.50 for Institutes or 10 Swiss francs or 16s. 6d. or $2.50 for individuals, payable to Treasurer, Th. P. Loosjes, Twentse Bank, Wageningen, Netherlands.
It is proposed in this quarterly journal, at present stencilled and in English, to give bibliographical information on such subjects as the following: New periodicals, new reference works, forthcoming publications, and general information on offers or requirements of publications by libraries, on changes of addresses of institutes, etc., on forthcoming congresses. In addition short original articles will appear on agricultural libraries in different countries, two such articles being included in No. 2 on German and Scandinavian libraries. It seems likely to prove an extremely valuable publication giving information not generally available in scientific or agricultural journals.

Noted.

3234.

a Andersen, H., and Neergaard, P.
5. årsberetning fra Statens Plantetilsyn vedrørende frøpatologisk kontrol, 1. april 1952–31. marts 1953. **(5th Annual Report of the Danish Plant Service for Seed Pathology, 1 April 1952 to 31 March 1953.)** [English summary ½ p.]
Tidsskr. Planteavl, 1956, **59**: 867-76.

b Arizona.
Annual Report of the Arizona Agricultural Experiment Station, 1954/55, 1956, pp. 19.
An inventory of research projects and publications.

c British Columbia Department of Agriculture.
Agricultural Statistics Report, Year 1954, Victoria, B.C., 1956, pp. 38.

d Department of Agriculture for Scotland.
Agricultural statistics, 1954, Scotland, H.M. Stationery Office, Edinburgh, 1956, pp. 99, 5s.

e Dominica.
A.R. Department of Agriculture and Forestry for 1953, pp. 20.

f Fiji.
Annual Reports of Divisional and Specialist Officers 1954, Department of Agriculture, Fiji, being *Bull.* **29**, Suva, pp. 53, 4s.
See also *H.A.*, 25: 4468.

g Institut des Fruits et Agrumes Coloniaux.
Rapport annuel 1949. **(Annual Report of the Institute of Colonial Fruits and Citrus, 1949),** Paris, pp. 130+8, illus. [received 1956].

h Institut National de la Recherche Agronomique.
Travaux effectués par les stations agronomiques en 1954. **(Work of the agricultural stations [in France] in 1954.)**
Ann. agron., 1955, **6**: 683-958.
See also separate abstracts.

i Ireland Department of Agriculture.
Twenty-fourth Annual Report of the Minister for Agriculture of the Republic of Ireland, 1954-55, Dublin, 1956, pp. 174 +appendices pp. 86, 8s. 6d.

j "De Lange Ossekampen", Wageningen.
Jaarverslag 1953, Centrale Bemestingsproefveld voor de Fruitteelt "De Lange Ossekampen", Wageningen. **(Annual Report "De Lange Ossekampen", Central Manurial Trial Ground for Fruit Culture, Wageningen, for 1953),** pp. 121, illus.
Experiments with apples, pears and red currants.

k LUDDINGTON (N.A.A.S.).
Station Guide Luddington Experimental Horticulture Station, 1956, Stratford-on-Avon, pp. 27.
Notes on trials of top and soft fruits, vegetables and flowers.

l MINISTRY OF AGRICULTURE, LONDON.
Farm Incomes in England and Wales 1953-54.
H.M. Stationery Office, 1955, pp. 61.

m MINISTRY OF AGRICULTURE, LONDON.
Agricultural statistics, 1952-3. England and Wales. Part I, H. M. Stationery Office, London, 1955, pp. 107, 5s.
Horticultural section pp. 94-107.

n MINISTRY OF AGRICULTURE, LONDON.
Agricultural statistics. England and Wales. Part II. Prices of agricultural produce 1948-1950, H.M. Stationery Office, London, 1955, pp. 115, 4s. 6d.

o MINISTRY OF AGRICULTURE, LONDON, DEPARTMENT OF AGRICULTURE FOR SCOTLAND, AND MINISTRY OF AGRICULTURE, NORTHERN IRELAND.
Agricultural statistics, 1953. United Kingdom—Part I, H.M. Stationery Office, London, 1955, pp. 38, 2s. 6d.
Horticultural section pp. 27-38.

p NATIONAL SHADE TREE CONFERENCE (TILFORD, P. E., EDITOR).
Combined Proceedings of 31st National Shade Tree Conference and 22nd Western Chapter National Shade Tree Conference, Santa Barbara, Calif., 1955, pp. 256, illus.

q PENNSYLVANIA.
68th Annual Report of the Pennsylvania Agricultural Experiment Station, 1954/55, being *Bull.* **599**, 1955, pp. 20.
Restricted to a list of research projects and new publications.

r SOUTH AUSTRALIA.
Annual Report of the Board of Governors, Botanic Garden, Adelaide, 1954-55, 1955, pp. 20, illus.

s STAHL, C.
Beretning fra Statsfrøkontrollen for det 84. arbejdsår fra. 1. juli 1954 til 30. juni 1955. **(Eighty-fourth Report of the Danish Seed Testing Station for the year 1 July 1954 to 30 June 1955.)** [English summary 2¼ pp.]
Tidsskr. Planteavl, 1956, **59**: 737-810.

t TANGANYIKA.
A.R. Government Chemist, Tanganyika, 1955, 1956, pp. 13, Sh. 1.
Nutritional studies on coffee, wattle, coconuts and pyrethrum.